NEW ZEALAND
JOURNAL OF

# Agriculture

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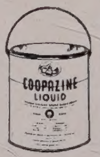

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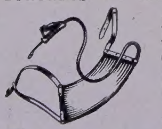

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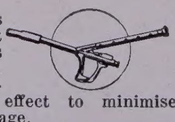

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Volume 87

Number 2

15 August

1953.

(Established 1910)

# NEW ZEALAND JOURNAL OF Agriculture

Published by

Direction

of

Hon. K. J. Holyoake,

Minister of Agriculture.

## *This Month's Cover*

*A feature of farming in New Zealand in the last 30 years has been the great increase in the production of fat lambs. In that period the total slaughtered per season has more than doubled and about 11½ million lamb carcasses a year are now exported, principally to Britain. Many of these lambs are fattened on grass alone, this being one of the benefits resulting from the availability of persistent, high-producing strains of pasture plants developed by New Zealand grassland research workers. Fat lamb production may be the main activity on a farm or a small flock may be run in conjunction with a dairy herd, as is commonly done in high-rainfall lowland areas of the North Island. This month's cover, which has been reproduced from a colour photograph by National Publicity Studios, shows ewes and lambs on an Inglewood farm.*

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The "Journal" is issued monthly. The subscription within New Zealand is 10s. a year; the overseas subscription is 13s. (sterling). The "Journal" may be ordered from any bookseller or newsagent, or direct from any office of the Department of Agriculture. Individual copies are available from Publications Section, P.O. Box 2298, Wellington, at 1s. a copy, post free.

Subscription inquiries (preferably accompanied by the address cut from a recent "Journal" wrapper) should be sent to the nearest office of the Department of Agriculture.

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REGISTERED AT THE G.P.O., WELLINGTON, AS A MAGAZINE.

# Modern Silage Making Demonstration at Waimate West Farm, South Taranaki

By E. M. BATES, Instructor in Agriculture, Department of Agriculture, Hawera, and J. O. BRASELL, Farm Machinery Instructor, Department of Agriculture, Palmerston North

SILAGE making in the past has always involved heavy manual labour and a high labour requirement. This limited the popularity of this method of surplus pasture conservation, but modern machinery is rapidly reducing the work involved.

About 1500 south Taranaki farmers had an opportunity to observe modern mechanical methods of silage making at Waimate West Demonstration Farm early in November, when a field day was organised on behalf of the farm committee by officers of the Department of Agriculture in close co-operation with the farm staff and local farm machinery firms.

The object of the field day was to try out the latest equipment available in the district under similar conditions in making stack or silo silage, consideration being given to the speed and efficiency in gathering and stacking the material and the labour required for each method, with final judgment deferred until the stacks are opened up.

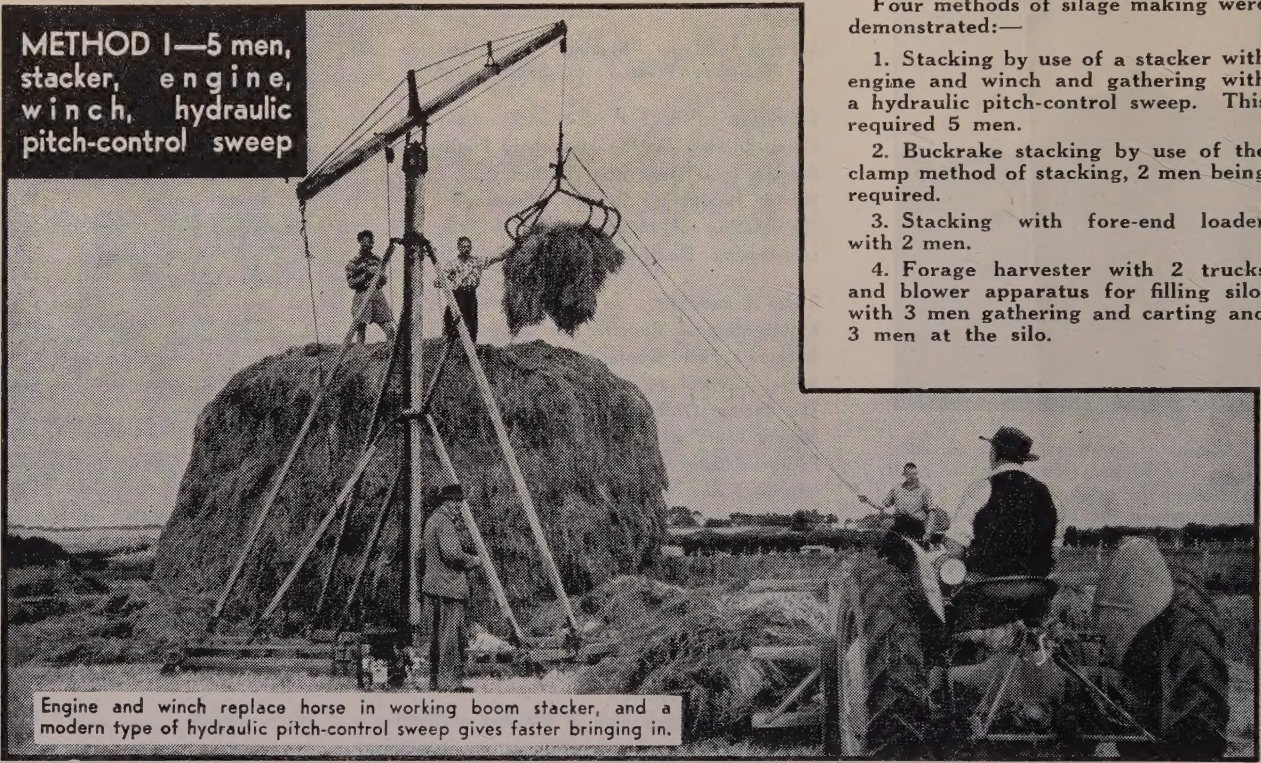
**Four methods of silage making were demonstrated:—**

**1. Stacking by use of a stacker with engine and winch and gathering with a hydraulic pitch-control sweep. This required 5 men.**

**2. Buckrake stacking by use of the clamp method of stacking, 2 men being required.**

**3. Stacking with fore-end loader with 2 men.**

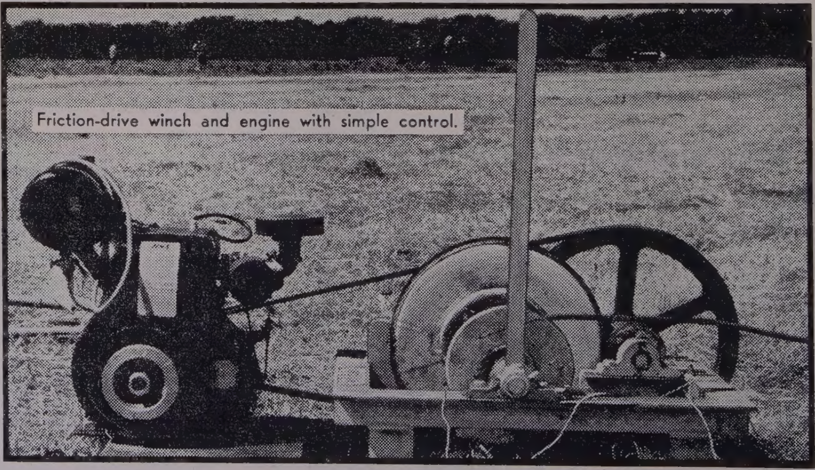
**4. Forage harvester with 2 trucks and blower apparatus for filling silo, with 3 men gathering and carting and 3 men at the silo.**



**METHOD 1—5 men, stacker, engine, winch, hydraulic pitch-control sweep**

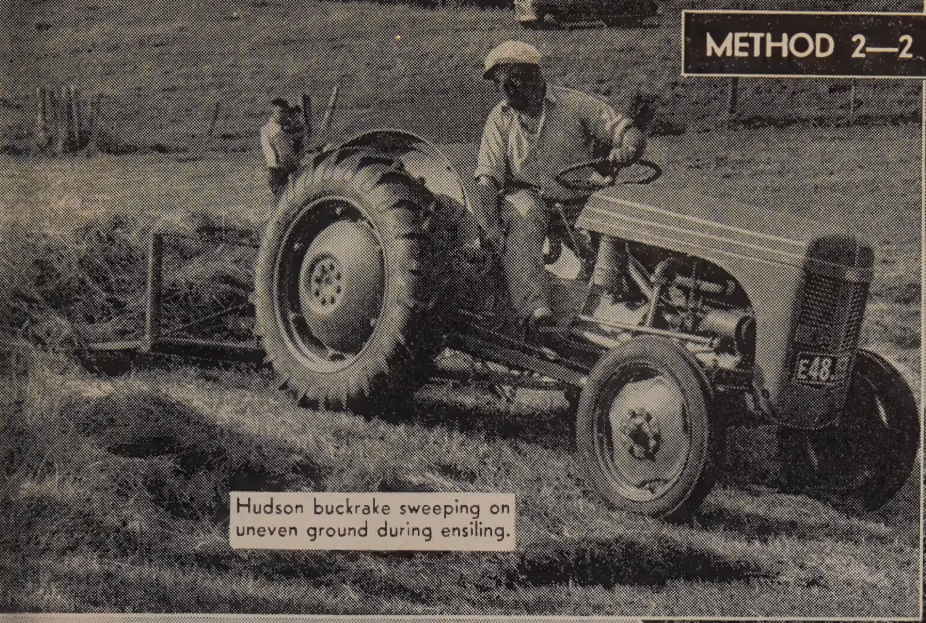
Engine and winch replace horse in working boom stacker, and a modern type of hydraulic pitch-control sweep gives faster bringing in.

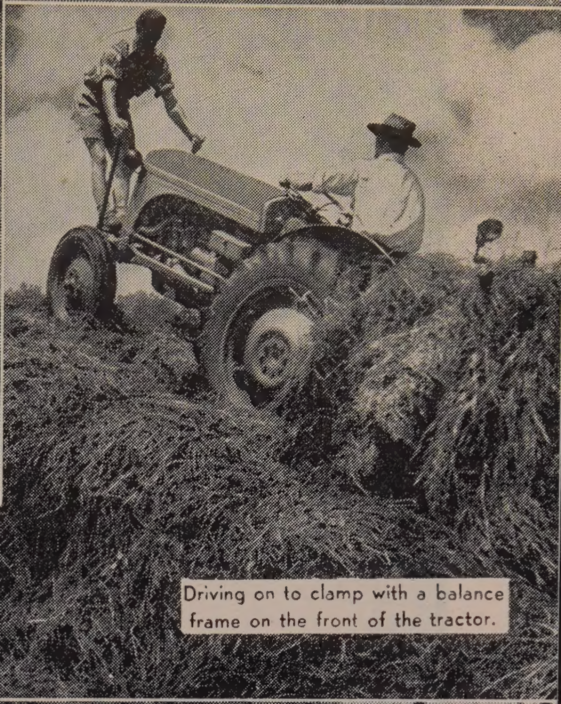
**In the conventional method of stacking, the special winch in place of the horse or tractor for lifting the crop saved 1 man, but 2 men were on the stack to cope with the speed of gathering resulting from the use of the improved pitch-control sweep. With 5 men the crop was harvested as fast as it was by the best of the other stacking methods used. However, labour requirements were still high.**



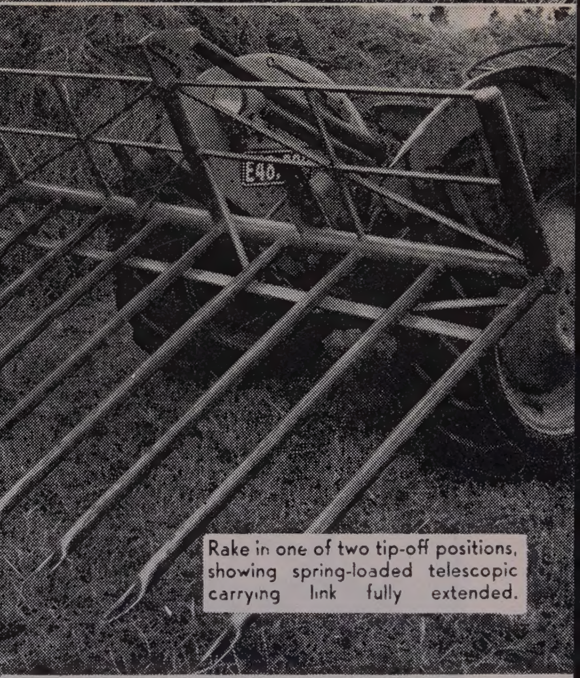
Friction-drive winch and engine with simple control.

## METHOD 2—2 men, buckrake for clamp stacking


Hudson buckrake sweeping on uneven ground during ensiling.


Driving on to clamp with a balance frame on the front of the tractor.

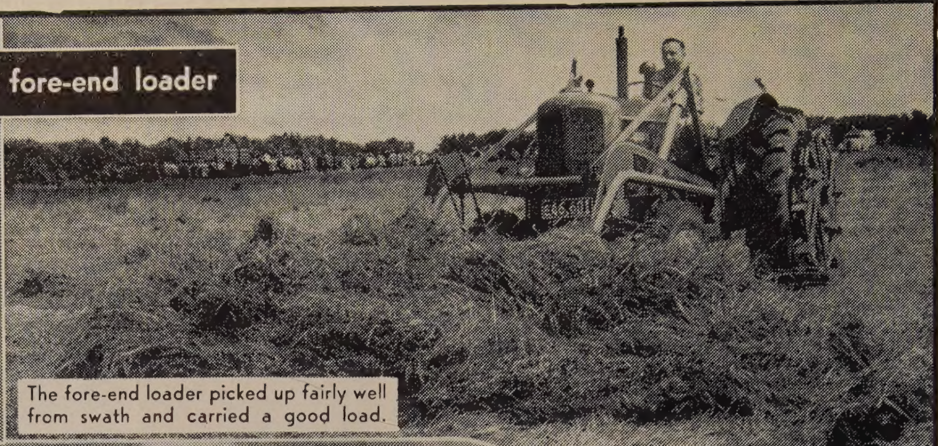
The buckrake has done much to raise the popularity of silage making, particularly on 1-man farms.


Rake in one of two tip-off positions, showing spring-loaded telescopic carrying link fully extended.

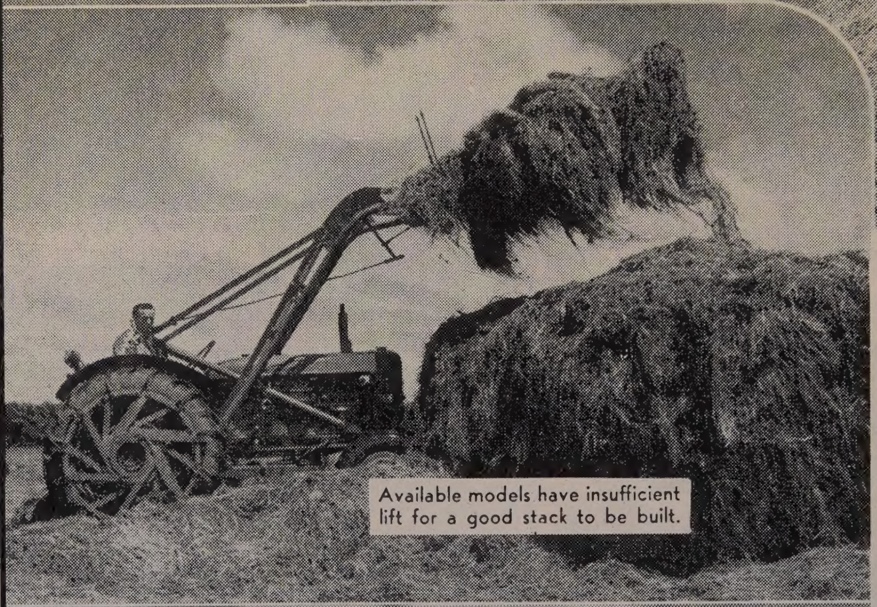
Buckrake ready to drop 5 to 7cwt. load where it is most needed.

**The buckrake requires a tractor with three-point linkage; otherwise it is low in initial costs and a real labour saver. Where overground stacking is done 2 men are essential to good silage making, 1 man doing the necessary spreading. Spreading is much less difficult when the buckrake width fits the swath and the crop is picked from the swath. This equipment is limited to silage making.**

## METHOD 3—2 men, fore-end loader

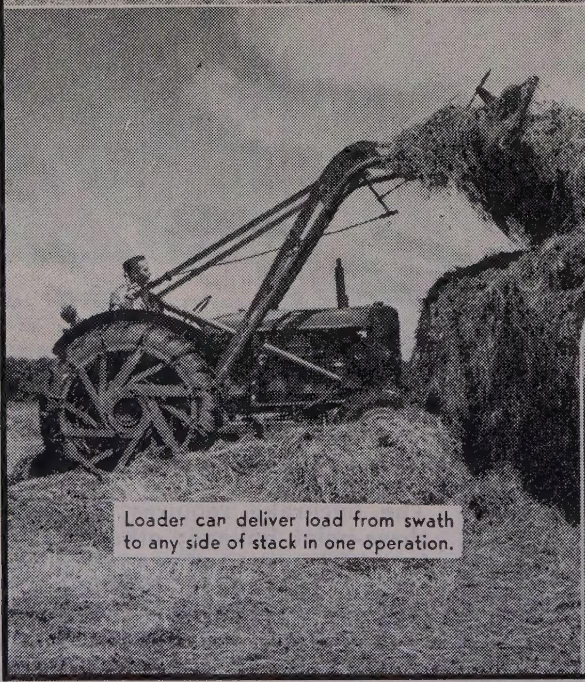


The fore-end loader picked up fairly well from swath and carried a good load.

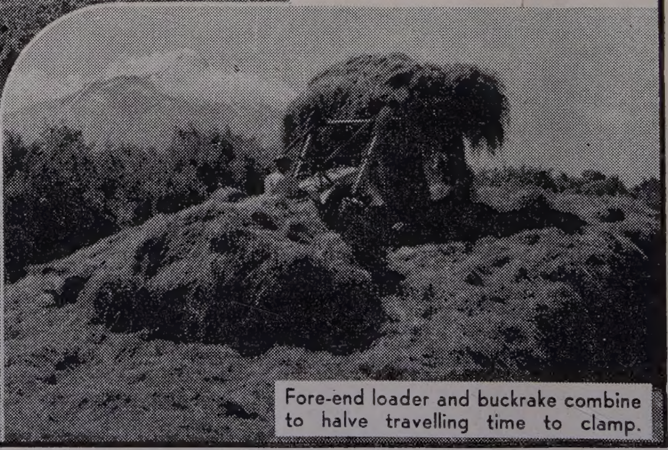


Available models have insufficient lift for a good stack to be built.

**The high initial outlay of the fore-end loader is warranted if the machine is required for any of the many other jobs it can do beside silage making. It is equally efficient in the making of hay and silage and can place material where it is required on the stack regardless of wind direction, but models available in New Zealand have definite limits in the height material can be lifted. The speed of gathering, with the direct lift to the silage stack, makes work for 2 men on the stack.**

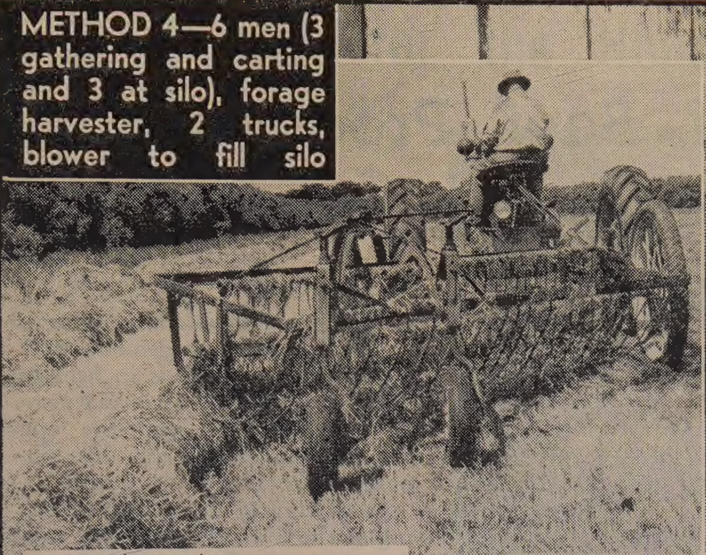


Loader can deliver load from swath to any side of stack in one operation.

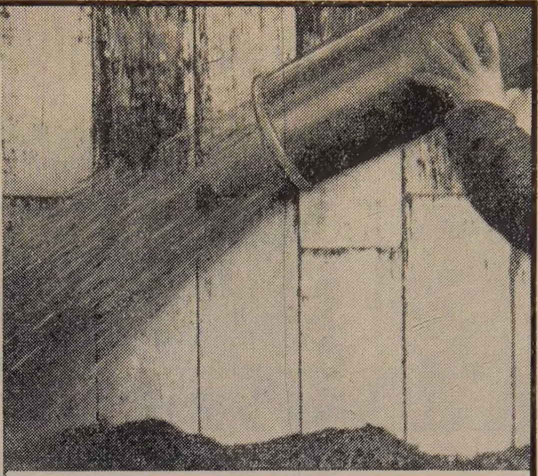


Fore-end loader and buckrake combine to halve travelling time to clamp.

## METHOD 4—6 men (3 gathering and carting and 3 at silo), forage harvester, 2 trucks, blower to fill silo

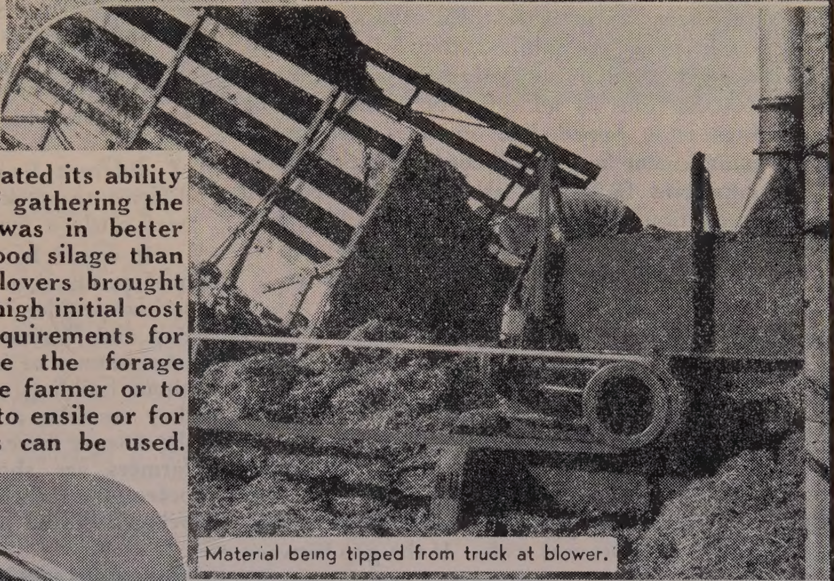


Modern 4-bar swath turner prepares crop for easier pick-up by forage harvester.

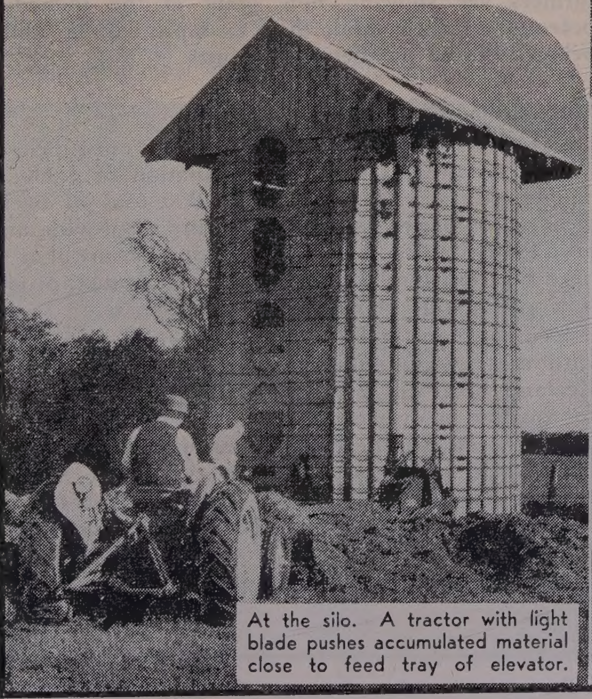


Inside silo the delivery pipe is composed of 3ft. sections making a flexible hose. A good spread is obtained by guiding the stream of material where it is most needed.

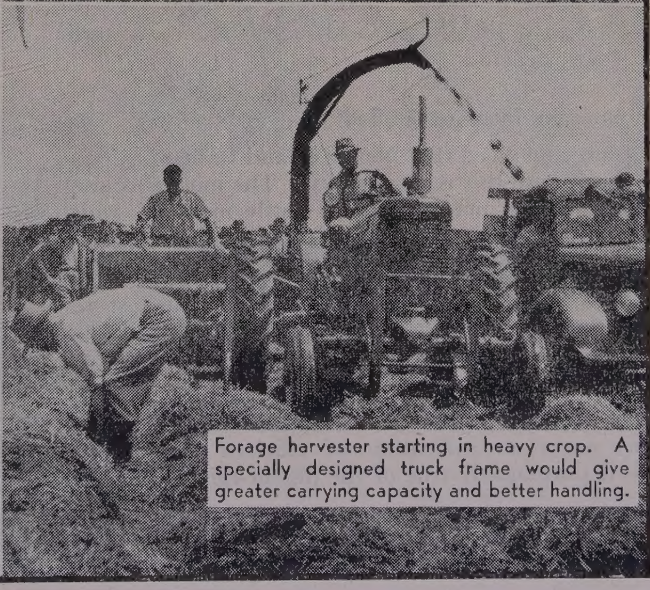
The forage harvester demonstrated its ability to double at least the speed of gathering the crop. The cut-up material was in better condition for the making of good silage than the usual tangled grass and clovers brought in by sweeps. Because of the high initial cost and relatively heavy labour requirements for making stack or silo silage the forage harvester is more suited to the farmer or to the contractor with big areas to ensile or for use on farms where trenches can be used.



Material being tipped from truck at blower.



At the silo. A tractor with light blade pushes accumulated material close to feed tray of elevator.



Forage harvester starting in heavy crop. A specially designed truck frame would give greater carrying capacity and better handling.

# Expansion of Beef Production

THE desirability of an expansion in beef production in this country was stressed by Mr. R. Herbert during his recent visit to New Zealand as leader of the delegation from the United Kingdom Ministry of Food. This is a field where there can be no fears of a fall in demand or of the competition of substitutes.

### British Home Production

British farmers have made strenuous efforts over the last few years to increase their output of meat, and if present plans are fulfilled, they will, by 1956, be producing 250,000 tons a year above the present level of 600,000 tons of all types of meat. Among other things it is hoped that greater attention to pasture management and to hill-country improvement will be important factors in achieving the required level of production. Even, however, if the 1956 target is reached, there will still be a substantial gap in supplies which will have to be filled by imports.

### Argentine Supplies

In the past Argentina was the largest supplier of beef to Britain; imports from there in 1938 were about 400,000 tons, but by 1952 they had dropped to around 100,000 tons. We cannot be sure what the future course of production in Argentina will be, but it is unlikely that meat will ever be available from there on anything like the pre-war scale. If the gap between British home production and total demand is to be filled, it will mainly be with meat from Australia and New Zealand.

### Encouraging Increase in Beef Cattle Numbers

I am convinced that New Zealand farmers can and will face up to this responsibility. The most encouraging sign is the increase in beef cattle numbers, which have gone up from 2,077,998 in 1948 to 2,282,000 in 1952.

It must be remembered too that in the last few years there has been a marked increase in sheep and dairy cow numbers, so that the increase in beef cattle has not been at the expense of anything else.

A high proportion of beef cattle to sheep is in many ways an indication of efficient management. This is particularly true of the higher-rainfall districts, where cattle play such an important part in the control of rank pasture growth.

### Lucrative Returns from Beef

If farmers are paying more attention to cattle as an adjunct to careful pasture management, they are also keeping a watchful eye on trends in beef prices. The changes that have taken place in recent years are interesting. For the 1939-40 season the opening schedule price for first grade beef was 32s. 6d. per 100lb. dressed weight; for 1948-49 it was 51s., and for the 1952-53 season it was 100s., a threefold rise since the beginning of the war. The opening schedule price for prime down cross lamb in 1939-40 was 8¼d. per lb. By 1948-49 it had increased to 11⅛d. per lb. and in the past season it was 19½d. per lb., an increase on 1939-40 of 136 per cent. This shows that beef cannot be regarded as the scarcely profitable sideline it was in the past. The relative profitability of different lines of production is something very difficult to work out, but farmers today are finding beef cattle a very lucrative source of income.

It would be wrong to minimise the difficulties of beef production. Feed during the winter can be a serious problem and on the east coast and in Hawkes Bay and Wairarapa the possibility of a dry spell in late summer or in autumn makes farmers rather wary about building up their stock numbers beyond what they consider a prudent level. Better husbandry is the answer here. In all parts of the country many farmers are showing how great is the immediate potential of their land; their example will be and is being followed by their neighbours.

### More Domestic Consumers

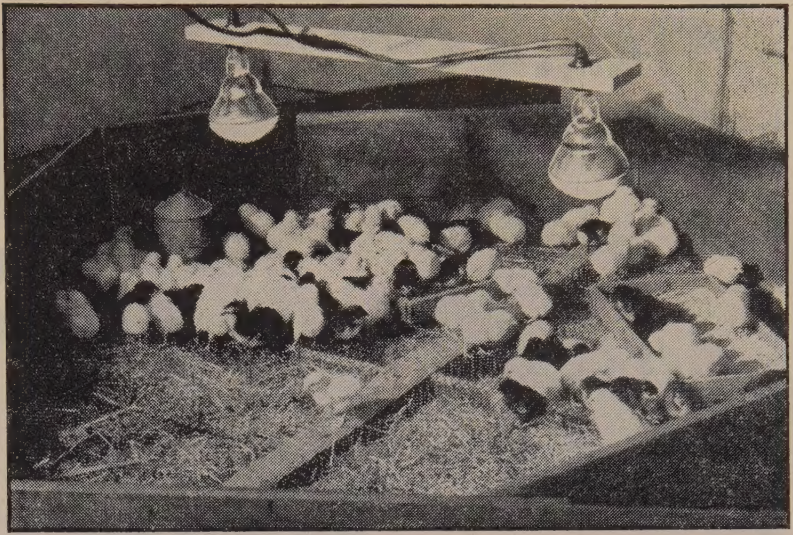
There is another point which we must bear in mind. At present with our population of 2,000,000 people we are eating nearly 100,000 tons of beef a year or 109lb. per person. If we are to provide more beef for Britain and at the same time ensure that the need of a growing population at home is met, production will have to be expanded still further.

To sum up, the need for more beef is urgent and with the resumption of the chilled beef trade New Zealand beef will be able to further its reputation for quality in overseas markets. Besides brightening the prospects for the British consumer, an increase in beef cattle numbers will have two other valuable results; it will help to swell New Zealand's export income and it will promote better farm management practices.

K. J. HOLYOAKE, Minister of Agriculture

# Chick Rearing for the Household Poultry Keeper

ALTHOUGH, in general, household poultry keepers buy perching pullets when they wish to replace their laying birds and do not rear pullets from day-old chicks, inquiries on chick rearing are received by the Department from householders. This subject has been reviewed in articles in previous years, but at this time of the year it is profitable to recall the more important aspects of chick rearing and this is done in this article by the Animal Industry Division of the Department of Agriculture.



Infra-red lamps in use with a wire frame and wooden surround. Note how the chicks are given water and food within the surround for the first few days.

UNTIL the last 2 or 3 years it was probably sound advice to recommend to household poultry keepers that if they were determined to attempt chick rearing, they should use hens. There were two main reasons for this advice—first, because brooder equipment for rearing small lots of chickens was not easily obtained, and second, because the average householder's home-made brooding equipment was very crude and unsatisfactory. Stories were frequently heard of attempts to rear chicks with hot-water bottles, in front of a fire, or with ordinary electric globes, and in most cases numbers of chicks were lost or at best second-quality, poorly grown birds resulted.

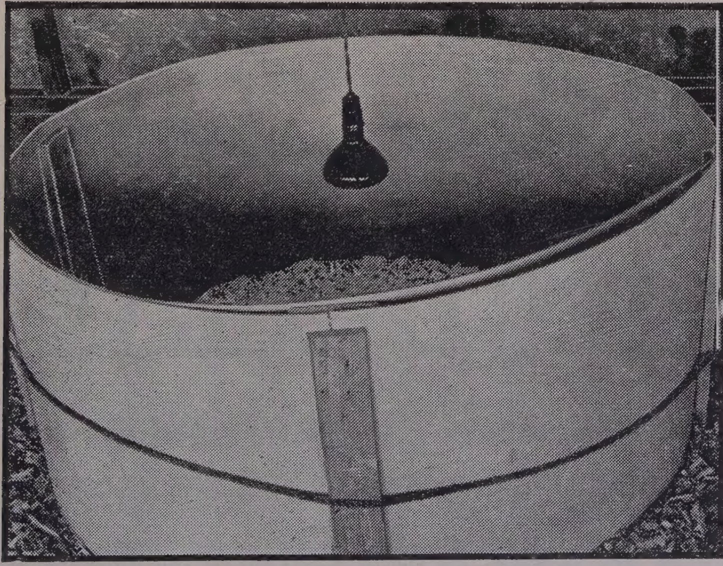
The position has changed considerably with the availability of infra-red electric brooding units and many people in cities have seen the bright emitter infra-red lamps in use with chicks in shop windows. The units are comparatively easily used if certain common-sense fundamental rules and the maker's instructions are followed.

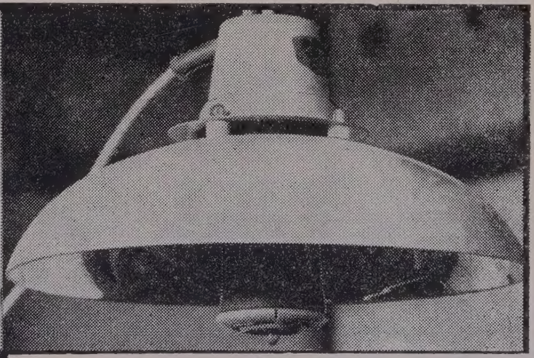
The following steps should be considered by the household poultry keeper who wishes to rear pullets for laying or cockerels for eating.

## Purchasing of Day-old Chicks

First it is necessary to ensure that the required number of day-old chicks can be supplied, and they should be ordered from a breeder well ahead of the time they are needed. If purchasing is left until the last minute, there is a risk of disappointment. Householders who do not know where to purchase chicks may obtain a copy of the annual list of poultry breeders accredited under the New Zealand Poultry Flock Improvement Plan from the local office of the Department of Agriculture or by writing to the Department, P.O. Box 2298, Wellington. Another important point for consideration is the best time at which to buy chicks if the pullets are to be used for laying. July and August are the best months in which to rear heavy-breed chicks such as Australorps and Rhode Island Reds. Later than this is not recommended for these breeds. Many poultry keepers favour crossbred birds such as those from White Leghorn males and Australorp hens. Chicks from this cross may be reared during July, August, and the first half of September. For light-breed chicks such as White Leghorns, August and September are good months, but later than the first half of October is not recommended. In general late-hatched chicks of both heavy and light breeds do not rear as satisfactorily or make as good birds as those hatched and reared in the months named.

When the day-old chicks have been ordered and the date of arrival fixed





[*Photograph at left by Fraser Niederer*

Left—The infra-red lamp is useful for rearing small batches of chickens not exceeding 70. For the first few days the chickens should be restrained in a surround or barrier, which can be enlarged a little periodically until it is no longer required. Above—The infra-red dull emitter, which can be used in the same way as the lamp at left.

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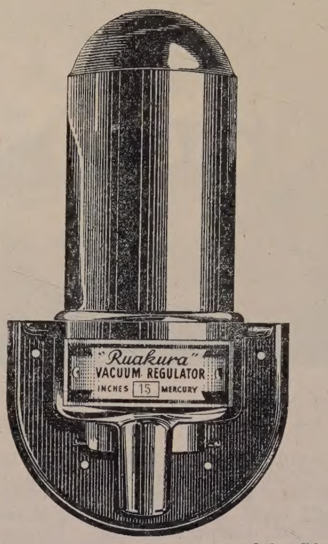

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In a bag of Belgian Basic Slag weighing 140 lbs. there are no less than 112 lbs. of essential fertiliser material.

it is essential to have the brooding equipment and necessary food ready for immediate use. When the chicks arrive a buyer should not be caught without some essential piece of equipment or the proper food and in consequence have "to make do" for the first day or two. This may well result in a check to the growth and health of the young chicks—a check from which they are not likely to recover fully—as well as possible early losses.

Some household poultry keepers or prospective ones may not know that day-old chicks may be purchased (a) as hatched; that is, cockerels and pullets mixed in approximately even numbers, (b) as day-old pullets, or (c) as day-old cockerels. Commercial poultry farmers employ chick sexers, who can separate day-old pullets and cockerels. Chick sexers are not infallible, but an efficient chick sexer will carry out his work with an average of about 95 per cent. efficiency. It is not uncommon, therefore, to find a cockerel among a small batch of day-old pullets or a pullet among cockerel chicks.

A newly hatched chick contains the yolk of the egg from which it has hatched. This yolk is gradually absorbed as food by the chick during the first 2 or 3 days of life, and because of this baby chicks can be sent in boxes for long journeys which may take a day or more. If day-old chicks had not these yolks on which to feed, it would be most difficult to dispatch them from a breeder's farm to customers all over the country. Buyers should not worry, therefore, if chicks are some hours on a journey before they are delivered; provided they are properly packed, they will not be harmed.

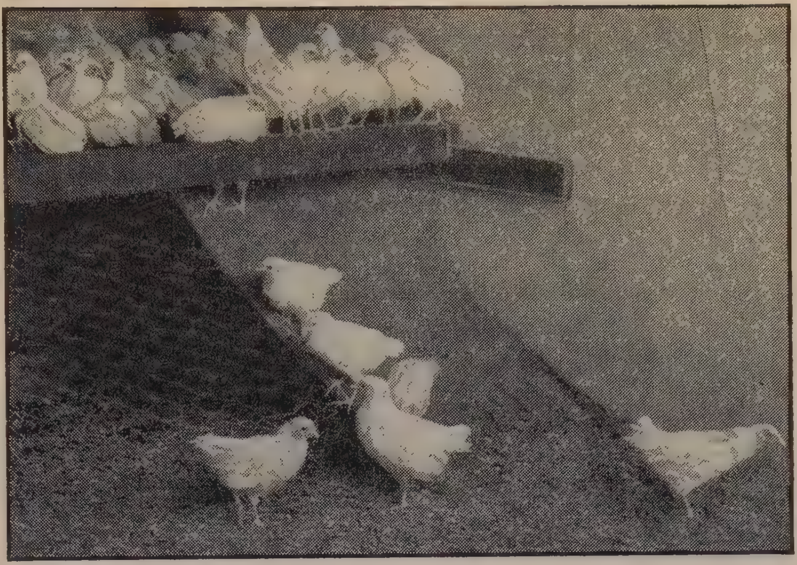
## Where to Rear Chicks

It is highly desirable to ensure certain environmental conditions for chicks if they are to be reared successfully. Ample light, good ventilation without draughts, and a dry floor are the first essentials. Householders may have a shed or a disused room with these essentials. A wooden floor or a dry concrete one is satisfactory, but either should be covered with 2 to 3in. of chopped straw, sawdust, or fine shavings. It is essential that this litter be dry at the start and be kept dry throughout the brooding period.

Any condition approaching stuffiness in the atmosphere, during night or day, should be avoided. Provided chicks have a warm area to go to, the fresher the atmosphere is the better. Chicks do not need coddling. However, floor draughts can be fatal.

## The Heating Unit

Two types of infra-red brooding units or heaters can be bought which are suitable for rearing small units of chicks. One is an infra-red lamp which is suitable for brooding up to about 2 dozen chicks and the other is a dull emitter infra-red heater. Both are suitable for the household poultry keeper. Care should be taken to follow the instructions issued by the makers, particularly in regard to the distance between the heating unit and the floor at the different ages of the chicks during the brooding period. It is important to enclose the baby chicks at the start with a surround made of wood or cardboard as shown in the illustration on page 103. This surround is gradually widened outward after the first 2 to 3 days when the chicks have become used to the source of heat. Ultimately the surrounds are removed and the chicks permitted the use of the complete floor area. Care should be taken to keep the litter stirred and clean where the chicks sleep under the infra-red lamp or unit. A little clean litter added to this area from time to time is desirable.



[Green and Hahn

A netting ramp from the floor to the front of the training perches enables pullets to be driven up to learn to roost.

## The Post-brooding Stage

Under ordinary circumstances chicks require no heat after they are 5 or 6 weeks of age; in fact very little heat is required after 4 weeks, depending on the weather. After the chickens are 6 weeks of age it is an advantage to get them off the floor, as if they are allowed to remain on the floor, they are liable to crowd in corners at night and overheat and sweat and in some cases smother each other. An easy method of perching the birds in the early stages is to have a wooden frame covered in 1in.-mesh wire netting raised about 18in. to 2ft. off the ground and to drive the young birds up on to this by means of a wire or sacking ramp in the evening as shown in the illustration on this page. After a night or two they will go up on their own. Perching on this wire frame, the birds are surrounded by fresh air and cannot sweat.

## Feeding

When the chicks arrive they should be placed inside the surround under the heat, care being taken that water is available from the start. The water should be placed near the warmth 12 hours before the chicks arrive or water should be used which has had the chill taken off. Ice-cold water in winter is not good for day-old chicks as a first drink. There are advantages in placing day-old chicks under the brooder heating unit late in the afternoon and allowing them to rest overnight before feeding, unless they have travelled a long distance and are very hungry.

Young chickens during their first 6 weeks require mash and grain. A No. 1 chick mash or starter should be used, being placed in a metal or wooden trough and available to the birds all day. A No. 1 chick grain or feed is placed on a wooden board or even on paper at first, being given at least three times a day. A quantity should be placed on the board and the chicks allowed to eat from this for 20 to 30 minutes, after which it should be removed until the next meal. After 2 weeks a No. 2 chick feed, which is coarser, should replace the No. 1 feed.

A daily feed of greenfeed is an important part of a chick's diet, and should be finely chopped lettuce, fresh grass clippings, or freshly cut green oats, cut when about 3in. high.

## Importance of Fish Oils

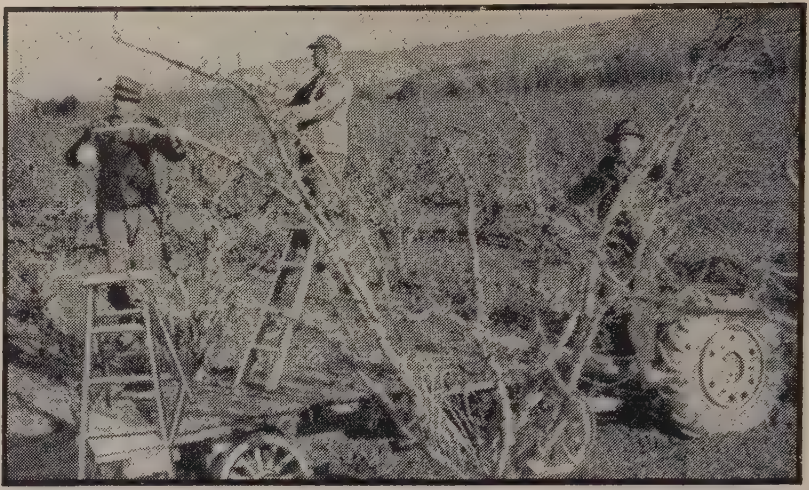
A mistake often made by inexperienced poultry keepers is to omit fish oil in the mash. Feeding fish oils containing vitamins A and D are readily obtainable. Vitamin A is essential for growth and health, and vitamin D prevents rickets or what is often termed "going off their legs". Where chickens are reared inside the oils must be fed in the mash if rickets is to be prevented. Many inexperienced poultry keepers have this trouble with their chickens through not being aware of the necessity of supplying fish oil in the diet. Three tablespoons should be thoroughly mixed in with each 10lb. of mash.

Last, the chickens should be supplied with a shallow box of small chick grit or fine oyster shell.

# Pruning Fruit Trees from Trailers

By J. COOMBE, Horticultural Instructor,
Department of Agriculture, Christchurch

THE pruning of fruit trees is often a cold and irksome job, especially if wet weather or heavy frosts occur. On many wet soils or when the ground begins to thaw after a frost the soil sticks to boots, with the result that the steps of the ladders become coated with sticky mud. This not only makes working conditions unpleasant, but also means that the workers' feet get cold, ladders become heavy to shift and dangerous to climb, and time is lost scraping mud from them. Messrs. Waigth and Sons, Roxburgh, have adopted a method which overcomes these unpleasant conditions and speeds up the work to such an extent that it has reduced their pruning time by approximately 30 per cent. of that taken when ladders were used from the ground.



Three men working on the front trailer in the system described in this article. The worker on the right is standing on an outrigger board and the worker on the left is using a ladder mounted on an outrigger board.

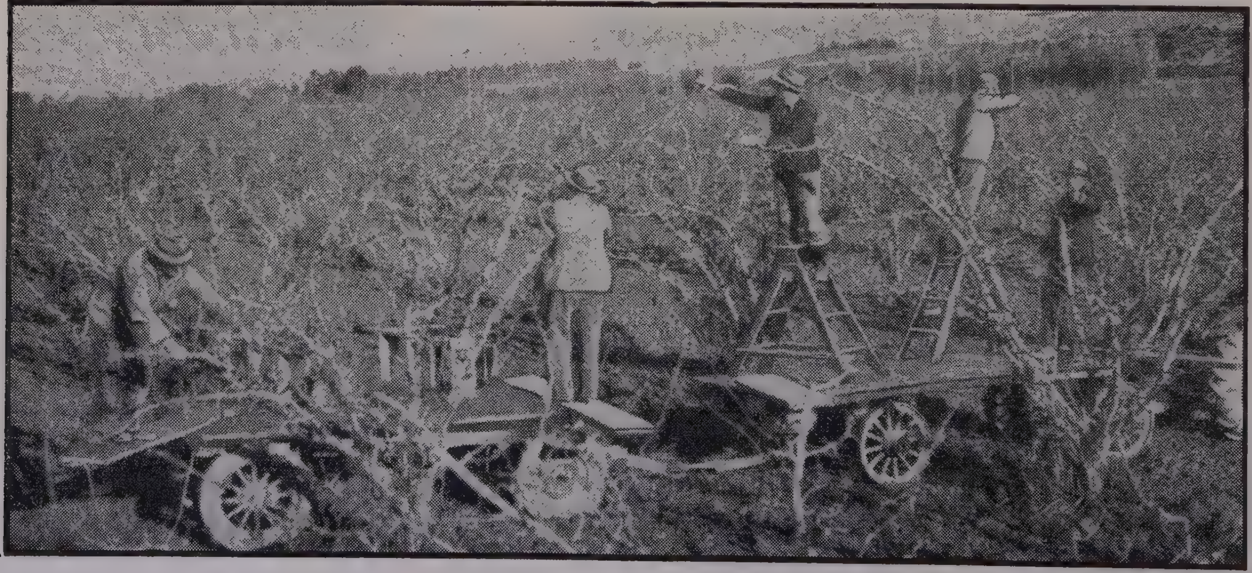
THE method necessitates the use of a tractor and two flat-topped, 4-wheeled trailers. The trailers are connected one behind the other so that the distance between their centres is the same as that between the fruit trees. Two men prune from each trailer, and a fifth man drives the tractor and assists in pruning so that both trees are finished together. Once work has begun in the morning the only worker to step on the ground is the tractor driver.

Each trailer is about 2ft. 6in. high and 16ft. long. On both front and back of each trailer there is a 12in. x 2in. plank which is bolted to the platform of the trailer by one bolt so that it can be pivoted in any direction required. These planks are pushed into position with the feet so that they extend out over the sides of the trailers and the workers can then walk round a little more than half of each tree from each trailer. The planks are swung back over the body of the trailer before the trailers are moved to the next two trees.

Two short ladders (about 3ft. 6in. high) are also carried on each trailer to be used for the higher branches. Ladders of this height used on the trailers are equal to 6ft. ladders worked from ground level, and they stand much more firmly on the trailer than they do on the ground. These ladders are made so that they can be placed on the outrigger planks (see ladder on left in illustration above). When the ladders are placed on the outriggers they rest on the bottom rungs instead of on the legs.

Only half of each row is pruned at a time, the trailers being hauled along both sides of each row. If the trees vary considerably in size, it is simple for one worker to step from one trailer to the other and assist on the larger tree so that both trees are completed at the same time. Only a few seconds are required to shift the trailers to each new position, whereas if ladders are used, a number of shifts have to be made to prune each tree. Also far less time is required in climbing up and down ladders from the trailers because of the shortness of the ladders.

Thanks are extended to Messrs. Waigth and Sons for the particulars given of their equipment.



Some of the positions from which workers can prune under the two-trailer system are shown in this illustration.

# Wheat Production in the Wairarapa

A crop of Tainui wheat, one of the varieties which has proved to be a consistent cropper in the Wairarapa.

THE world's exportable wheat supply may be regarded as a gigantic bank from which countries unable to provide their own needs draw supplies. With the population increasing in New Zealand and in most other countries the demand on the world's supply of wheat is steadily becoming greater, and it appears that if New Zealand is to be insured against a shortage in the future, it will be necessary for a greater proportion of the country's requirements to be grown here. In this article W. B. H. Smith, Fields Instructor, Department of Agriculture, Masterton, discusses wheat growing in the Wairarapa and gives reasons why it is considered the area used for this crop could be considerably increased in that district.

IN the Wairarapa there are approximately 30,000 acres of flat to undulating land with soils of medium to high fertility well suited to wheat growing. The climate of this area, which is situated in Masterton, Wairarapa South, and Featherston Counties, is suited to cropping, rainfall being in the 30 to 40in. range and most summers being hot and dry. Approximately 1200 to 1500 acres is sown to wheat annually, although during the war an effort was made to obtain a greater acreage, resulting in a maximum of 3728 acres in the 1942-43 season. It is considered that the area of wheat in the Wairarapa could readily be increased to 3000 acres without any difficulty and without any appreciable reduction in the production of meat and wool.

In the following table the acreages of wheat grown since 1935 are expressed as 4-year averages:—

AREA OF WHEAT IN THE WAIRARAPA, SHOWING ACREAGES BY COUNTIES

| Average 4-year period | Masterton | Wairarapa South | Featherston | Totals |
|---|---|---|---|---|
| 1934-35 to 1937-38 | 498 | 96 | 138 | 732 |
| 1938-39 to 1941-42 | 1008 | 66 | 224 | 1298 |
| 1942-43 to 1945-46 | 1479 | 381 | 549 | 2409 |
| 1946-47 to 1949-50 | 789 | 261 | 252 | 1302 |

High production from arable soils can be obtained only by sowing pastures with the improved strains of grasses and clovers. A rotation which involves periodic renewal of pastures is necessary if the highest possible level of production is to be maintained. A wheat crop included in the rotation helps in the receiving of some return from the built-up soil fertility and, at the same time, more than covers the cost of resowing. In this way wheat can be beneficial to the fat lamb producer, and the increase obtained from sowing down in new grass more than compensates for the loss of grazing.

## Soil and Climate

Wheat does well on good loams and similar rich soils, but it can be grown on a wide range of soils, its success on some of the lighter types being of course largely dependent on an adequate supply of moisture in the soil during the final stages of growth rather than on the soil fertility. Three distinct types of soils suitable for wheat growing in the Wairarapa valley are:—

1. Takapau silt loam, containing 6in. of dark, grey-brown silt loam over stony gravel. This soil structure is typical of the main cropping areas of the plains surrounding Masterton and parts of the Carterton and Greytown districts. It is a high-fertility soil and the presence of shingle in the subsoil allows free drainage.
2. Kairanga silt loam and clay loam, containing 6 to 12in. of grey, heavy silt loam on clay loam. It is a young, fertile soil which is to be found on the flats adjacent to the Ruamahunga River and near Lake Wairarapa.
3. Wanganui loam, a greyish-black loam overlying 6 to 18in. of greyish-buff clay loam. A medium-fertility soil typical of the Taratahi Plains and the rolling country in the Martinborough district.

The climate in these districts is generally favourable for wheat, with plenty of rain for growth, and except in the occasional difficult season conditions are quite satisfactory. In the lower Wairarapa valley the average rainfall is approximately 30in. yearly and in the northern part of the district it is about 40in. yearly. The distribution is somewhat uneven, most of the rain falling in winter; summer is usually dry enough to ensure good harvesting conditions.

## Land Preparation

The methods and amount of cultivation required in preparing land are dependent on soil conditions and the previous crop. A well-prepared seed-bed is essential for the best results. Most crops are spring sown on lea land which has been ploughed and worked down. With this one-furrow method of handling the lea early ploughing is essential. If the ploughing is done early, weathering agents greatly assist in producing a more mellow soil. Grass paddocks for spring-sown wheat should be ploughed in June to a depth of 6in.

A preliminary skim ploughing is not necessary if the turf is thin, as is often the case with old grass stands. When pastures are of a twitchy nature it is often advisable to roll on the furrow to ensure a firm bottom and hasten the decomposition of the turf. Subsequent cultivation should be designed to secure consolidation without too fine a surface. If the surface is very fine, it is liable to cake, especially on the stiffer soils. During July and August the seed-bed is prepared with the discs and harrows by successively shallow working up to sowing time, when the soil texture is coarse and loose on the surface, but fine and firm underneath.

## Sowing and Manuring

Most of the Wairarapa wheat crop is sown during July and August, with a portion of the later sowings extending into September and early October. All wheat sown in spring requires a heavier seeding than if it were autumn sown, because less tillering takes place with spring-sown crops. In higher-rainfall districts, too, thicker seedings can be made, as the necessary moisture is present to bring the

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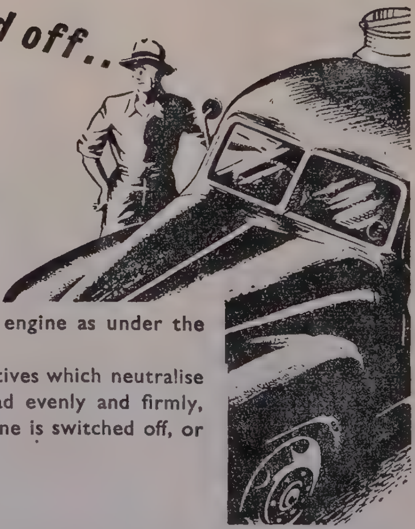
*But I've switched off . .*



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These varieties possess the characteristics required for spring-sown wheat in the Wairarapa. They are quick-maturing, good milling wheats with high-yielding capabilities, and are resistant to lodging and grain loss.

greater number of plants to maturity. Usually 2 to 2½ bushels per acre are sown, the heavier seeding rate for heavy land and the lighter for drier soils. The seed is drilled through every coulter to a depth of about 2in., with light harrows following the drill. Care should be exercised in the setting of the drill to obtain the desired seeding rate, as the quality of the seed affects the seeding rate per acre. Seed wheat which has been slightly sprouted or which contains chipped or broken grain needs to be sown at a heavier rate than well-developed wheat which has been machine dressed.

Wheat intended for seed should be machine dressed to remove weed seeds and poor, unprofitable grain and the seed should be treated for control of stinking smut. This is done by dusting the seed with organic mercurial compounds such as "Agrosan" and "Ceresan". These preparations are in powder form. Treatment consists of thoroughly mixing the powder with the seed wheat, and is usually done while the grain is being machine dressed. Dry dusting of the seed does not in any way affect the keeping quality of the grain or injure germination if the wheat is in good condition when treated and is afterward properly stored.

Growers are recommended to use Certified seed, each sack of which carries a Departmental seal and a tag bearing the name of the variety and the registered number of the line. Such seed is the produce of crops of high purity which are virtually free from loose smut. Each Certified line of seed is covered by a purity and germination certificate and growers should examine the certificate before sowing.

The use of phosphatic fertilisers with the sowing of wheat is essential to ensure well-grown crops and high yields. The opinion is held that payable results are obtained by using up to 2cwt. of superphosphate per acre. In place of superphosphate, "super. compound" or serpentine superphosphate can be used with equal results. Trials carried out during the last 6 years have shown that serpentine superphosphate sown at the same rate per acre as superphosphate will give yields equally as good as those from superphosphate.

## Varieties to Sow

The most suitable wheats for sowing in the Wairarapa must possess the quick-maturing characteristics required of spring-sown crops. In addition, they should be good milling wheats with high-yielding capabilities and should be resistant to lodging and grain loss. These characteristics are to be found in Cross 7, Hilgendorf, and Tainui, which have proved to be consistent croppers and ideal for direct heading. They have replaced Jumbuck and Hunters, which are not heading wheats. Tuscan, a one-time favourite in the district, has now been replaced by Cross 7, which matures about a week earlier, is more resistant to lodging, and is very suitable for heading. Cross 7 is used for earlier spring sowings on the heavier soils or generally where fertility is high, such as after a clover or lucerne crop. Hilgendorf matures about a week earlier than Cross 7 and does well on medium classes of soils. Tainui is a true spring wheat and ripens fully a fortnight earlier than Cross 7. It is not suitable for early sowings on heavy land, where it is liable to grow rank and lodge, but for late sowings on lighter land it has distinct advantages. Tainui offers the best prospects of success when sowings are delayed by wet weather or through late preparation of the ground. As it yields well and its resistance to shaking is good, the variety has completely displaced Jumbuck, which is quite unsuitable for direct heading.

Tainui, Cross 7, and Hilgendorf hold the grain well in the head and this factor reduces loss caused by winds so prevalent in the Wairarapa at harvest time. Crops can be left standing for up to 4 weeks with surprisingly little grain loss while favourable harvesting weather is being awaited.

## Harvesting

Since the introduction of the header harvester to the Wairarapa (there are now over 50 machines in the district) harvesting of the crops presents little difficulty. Header harvesters are of comparatively recent introduction to the district, and although the general opinion at one time was that headers were unsuitable, most of the wheat is now handled by this equipment, either by direct heading or by the windrow method, mainly the former. Heading reduces harvesting to a single operation and cuts the per bushel cost to a minimum. In addition, less mechanical energy is expended per bushel of grain

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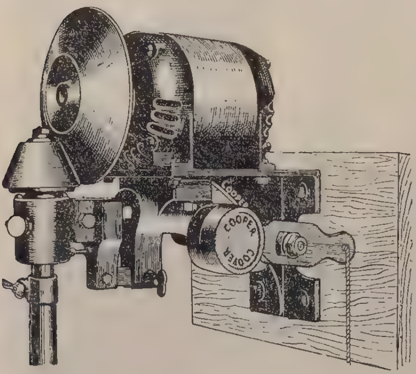

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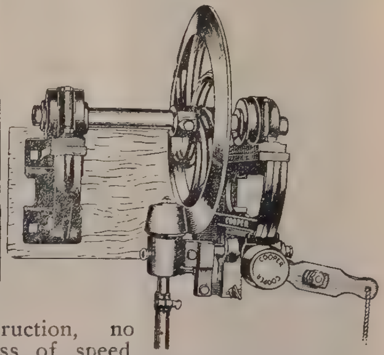

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threshed, as a smaller bulk of material has to be dealt with.

In a normal season harvesting usually begins toward the end of January and continues into February. Under good harvesting conditions there is no advantage in cutting the wheat crop for the pick-up machine to thresh, except for those varieties which shed badly in windy weather. Direct-headed crops must be left later than those cut with the binder or mowing machine, but if the weather breaks, the standing crop will go through with much less loss than the cut crop and will dry out for direct heading in the next fine spell much quicker than the stooked or windrowed crop. Crops ready for cutting in early February have been direct headed as late as March in very unfavourable seasons with no appreciable loss of grain.

[*National Publicity Studios*

With the equipment now available direct heading of wheat is done almost everywhere in the Wairarapa.

## A Wairarapa Wheat-growing Farm

Three miles west of Masterton there is a 171-acre cash cropping and fat lamb farm which has specialised in wheat production over the last 10 years. During this period up to 30 acres of wheat were grown annually and the average yield of the crops was 50 bushels per acre. This yield is much higher than the average yield for the Wairarapa district, which is 36 bushels per acre. The soil type on this farm is classified as a Takapau silt loam over stony gravel, which is a high-fertility soil, and the presence of shingle in the subsoil allows free drainage. Rainfall varies from 35 to 40in. a year and the country tends to dry out during summer. December, January, and February are usually dry months, with the weather breaking in March. Such a climate suits the production of wheat and under normal seasons some excellent lines of wheat are harvested. In the cropping programme grain crops claim first place, followed by small seed production, and these are made to blend in with fat lamb production. A crop rotation has been worked out to enable the farmer to receive some return from the fertility built up by high-producing pasture, yet it is wide enough to avoid undue depletion of the soil fertility or impairing of the physical condition of the soil, which would make it difficult to re-establish and maintain good pastures.

The types of cropping rotation favoured are:—

Old grass; spring-sown wheat; spring-sown wheat; barley or oats; autumn pasture (ryegrass and white clover).

Old grass; spring-sown wheat; spring-sown wheat; greenfeed oats; spring-sown pasture with rape.

Under the above rotations Cross 7 has given consistently good yields and a second crop following a first crop shows only a small decline in yield. Pastures are maintained for 3 to 4 years before they are ploughed and sown back to wheat.

## Costs and Returns

The price paid for wheat in the North Island was fixed at 13s. 3d. per bushel for the 1952-53 season and this price was arrived at after due consideration had been given to costs of production and in an endeavour to secure a greater acreage in wheat. The margin of profit from wheat production compares favourably with fat lamb raising and the price should be an inducement to farmers to bring wheat back to its former important place as the main cash crop in rotational farming practice.

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The above bulletins, part of a series of over 350 on all aspects of farming, are available post free from the nearest office of the Department of Agriculture, or from the Head Office of the Department, Box 2298, Wellington.

The following assessment based on a 40-bushel crop illustrates the costs and returns from wheat growing on a typical Wairarapa farm.

### COSTS OF WHEAT GROWING AT RULING CONTRACT RATES

| | Per acre | | |
|---|---|---|---|
| | £ | s. | d. |
| Ploughing out of pasture .. | 1 | 10 | 0 |
| Discing—2 cuts with tandem discs .. .. .. .. | 1 | 5 | 0 |
| Harrowing—2 strokes .. .. | | 7 | 6 |
| Drilling seed and manure .. | | 12 | 6 |
| Seed—2 bushels .. .. .. | 2 | 0 | 0 |
| Manure—2cwt. .. .. .. | 1 | 0 | 0 |
| Chain harrowing .. .. .. | | 5 | 0 |
| Header harvesting .. .. | 2 | 10 | 0 |
| Loss on sacks 1s. 4d. each .. | | 18 | 8 |
| Cartage and incidental expenses | 1 | 0 | 0 |
| Total expenses .. .. .. | 11 | 8 | 8 |
| Weed control—hormone spraying (if necessary) .. .. | 1 | 10 | 0 |
| **Returns:** 40 bushels at 13s. 3d. | 26 | 10 | 0 |
| Margin per acre to cover portions of items such as rent, interest on working capital, sundry overheads, rates, depreciation and maintenance on buildings, and owner's labour reward .. .. | 15 | 1 | 4 |

If wheat is taken once in the rotation—or twice on heavy land—there can be no possibility of any real lowering of soil fertility. With the use of improved strains of grasses and clovers and the more general application of lime and fertilisers, rotational cropping is now an excellent fertility builder, and the growing of wheat in a suitable rotation can be regarded as a sound practice.

Hoggets like these, fed on a supplementary crop and with access to good-quality hay, could be bred from, but they must be well grown and well fed from 6 weeks before lambing up to weaning.

# The Mating of Hoggets

By A. W. J. APPS, Livestock Instructor, Department of Agriculture, Palmerston

FOR many years sheep farmers have been convinced that breeding from young stock has a tendency to reduce the vitality, wool clip, and general frame of a flock; in fact, not long ago farmers were not inclined to breed from 2-tooths (18 to 20 months old) for that reason, but to wait until the 4-tooth stage ($2\frac{1}{2}$ years old) before mating. Now that breeding from the 2-tooth is an established custom the stage has been carried a step further by some farmers by mating hoggets (7 to 8 months old).

ONE farmer in the Palmerston district found over the years that the odd hogget would be in lamb by accident with no apparent harm at delivery or during lactation; he also found that quite often those hoggets would produce twins the following year, whereas 2-tooths seldom produced twins in their first pregnancy. On this Palmerston farm all sheep are well pastured and 2-tooths were very forward in condition at mating and maintained good condition through to lambing.

## Mated and Unmated Hoggets Compared

In 1949 the farmer drafted off 124 of his best hoggets and put 106 of them to a Southdown ram. The other 18 were kept as a control to check if there were any differences in the two groups. The lambing percentage in the hoggets was 64 and all lambs were sent to the freezing works with lamb drafts, including lambs from the older ewes. The practice has been continued each year with about the same percentage, and accurate inspection of the flock from time to time shows that there is no difference in the 4-year-old ewes between those which had produced a lamb as a hogget and those which had not been mated until the 2-tooth stage. Hoggets generally were better mothers than 2-tooths at first lambing and it was found each year that the 2-tooth which had produced a lamb as a hogget was a better mother, produced a greater number of twins, and had no troubles such as the sheep leaving the lamb. The only difference from normal in animal husbandry was the addition of a small amount of lucerne fed during winter.

The aim of this farmer was to reduce the troubles at lambing time among his young ewes and this was achieved as well as securing an extra crop of lambs. The flock is almost straight Romney and the farmer retains his own replacements, so the lambs from the hoggets are of no use as replacements because of the Southdown ram being used. Lambing is drawn out over a longer period because of genital maturity taking place during the mating and some hoggets, being later lambs, are longer reaching maturity. The lambs from the hoggets are smaller and, though they cannot compete with the lambs from the older ewes for size, they fatten just as readily.

## Advantages and Disadvantages

The advantages of this practice of mating hoggets are:—

Lambing troubles at the 2-tooth stage are reduced.

Hoggets are better mothers than 2-tooths at first lambing.

Extra crop of lambs.

Greater number of twins at the 2-tooth stage.

The disadvantages are:—

Longer time to complete lambing.

Lambs are not suitable to retain for flock replacements.

The practice of mating hoggets cannot be recommended to all sheep farmers, because hill-country flocks are not as well pastured as paddock ones, and generally hoggets are not in a sufficiently forward condition to mate; but there are many farmers on rich, highly fertile country who might try out the practice of mating hoggets on a small scale. However, it is important that hoggets to be mated should be well grown and receive the best of feed from 6 weeks before lambing up to weaning.

☆

# Farm Contractors and Workers' Insurance

SOME contractors employing men on farm contracts appear to be under a misapprehension that it is not their responsibility to insure their workers, as is required under the Workers' Compensation Act. However, this obligation is still the responsibility of the contractor unless the farmer is the legal employer of the contractor's men.

In an explanation of recent changes in workers' compensation legislation, with special reference to the position of contractors, the Workers' Compensation Board seeks the co-operation of farmers to ensure that contractors fulfil their insurance obligations.

The Board states that as the statutory indemnifier of uninsured employers it has had to pay a number of claims wherein contractors engaged in work on a farm failed to insure their workers. In many cases the contractors were of the opinion that the workers were covered by the farmer's own insurance company. However, there is no liability on the farmer's insurance company unless the farmer is, in fact, the legal employer of the contractor's men.

Until the 1949 Workers' Compensation Amendment Act repealed Section 13 of the principal Act, a principal and contractor were both deemed to be employers of the contractor's workmen, but this is no longer the case. A contractor, therefore, as an employer, must fulfil his obligation to insure his workmen. The 1950 Amendment Act provides penalties for those who fail to do so, and offenders are liable to prosecution.

The Board suggests that farmers should ask their contractors to produce evidence of insurance before they are allowed to proceed with a contract.

Section 63 of the principal Act is still in force. Under this section a principal is responsible for any working contractor in connection with work in a gold mine, coal mine, the cutting of standing timber, or the clearing of land of stumps or logs; in these instances the contractor still remains liable for his own workers.

# Low-tension Electric Soil Warming

SOME years ago soil-heating cable for 230-volt operation was introduced. Although reasonably successful and safe with some types of cable, this type of soil-warming equipment has generally given way to bare galvanised iron wire with the use of low voltages up to 30 volts. Although the initial cost of the low-tension method of soil warming is slightly higher than that for the high-tension cable, the greater safety, flexibility, and ease of installation and replacement far outweigh the slightly higher initial cost. The operating costs for both methods will be the same for any installation. A great deal of research has been carried out in England on this type of installation, and a few have been installed in New Zealand, where the field of application would seem to be for the heating of propagating benches, propagating frames, and early-season warming of soil in tomato glasshouses. To ensure that any installation will be satisfactory both electrically and horticulturally the Department of Agriculture requested the co-operation of the Electric Supply Authority Engineers' Institute to prepare technical electrical data suitable for climatic conditions throughout New Zealand. This article has been prepared by I. R. Robinson, chief engineer and general manager of the Hutt Valley Electric-power Board, in association with A. A. Powell, Storage Specialist, and Horticultural Instructors of the Department of Agriculture.

BEFORE any commitments regarding equipment are made the local electric supply authority should be asked if electricity will be available for soil warming or space heating for horticultural purposes. The design of any installation is somewhat complicated and the local power authority should be consulted before any equipment of this type is installed. The written permission of the electric supply authority must be obtained for the electrical wiring work, and if any of this wiring is intended to operate at a pressure in excess of 20 volts, the work must be done by a registered electrician.

Experiments in England show that it is not necessary to have the power on continuously for soil warming, as a "dosage" method providing for a certain heat input each day is equally effective.

Commercial installations should be designed to provide by a time switch the necessary heat over 10 hours during the night to economise in the cost of power.

The transformer must be built to operate efficiently in the warm, damp atmosphere of a glasshouse. The low-tension terminals on the transformer should have ample capacity with brass lock nuts, because the current to be carried becomes quite high for large installations.

## Thermostatic Control of Soil Temperature

In England a number of growers are using thermostatic control for their propagating beds, but a great many are controlling temperature by hand switching. The range of the thermostat should be 45 to 85 degrees F. with a temperature differential of 3 or 4 degrees. The thermostat should be fitted with a protective sleeve and it should be placed 1½in. above and across the warming wires.

For hand switching the use of an intermittent control device similar to those fitted to most electric cookers is suggested.

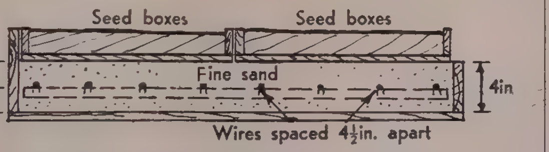

Fig. 1—Method of arranging seed boxes or seedling boxes over sand with soil-warming wire installation.

Propagating beds are usually maintained at a temperature of 60 to 63 degrees F. Tomato roots require a minimum temperature of 57 degrees F.

## Installation Methods

No special knowledge of growing is required for the use of electric soil warming; good standard cultural practices should be applied.

Where boxes are used for seed germination and for seedlings the wires should be buried in sand and the boxes placed on the top of the sand, close together to conserve the heat as shown in Fig. 1.

When propagating is being done in pots 3in. or more of sawdust should be placed on top of the sand and the pots bedded in the sawdust. For this type of propagating bench the warming wires should be placed from 4 to 6in. apart, depending on the design of the installation.

When wires are being used for soil warming in frames or troughs or for warming tomato glasshouse soil the depth at which they should be buried will depend on the size of the installation and general horticultural practice. If the soil is replaced each year, the wire should be buried to a depth of from 6 to 8in., and when it is necessary to replace the soil the wires should be lifted and replaced. When it is not the practice to replace the soil, but to cultivate only, the warming wires should be buried to a depth of about 12in. This allows adequate depth for cultivation and sterilisation without disturbing the wires. The spacing of the legs of the warming wires should not be less than 4in. or greater than 12in. The greater the depth of the wires the wider the spacings between the wires.

For comparatively small propagating beds 2in. x ½in. timber battens about 2ft. apart can be laid across the width of the bed, and the wires can be stapled to the battens to prevent them coming together and forming a short circuit.

For mechanical reasons No. 10, 11, or 12 gauge (standard wire gauge) galvanised iron wire is used. The warming wires may be installed either on the single wire system for amateur or small commercial working or on the grid system with a simple form of tensioning device for the larger commercial installations.

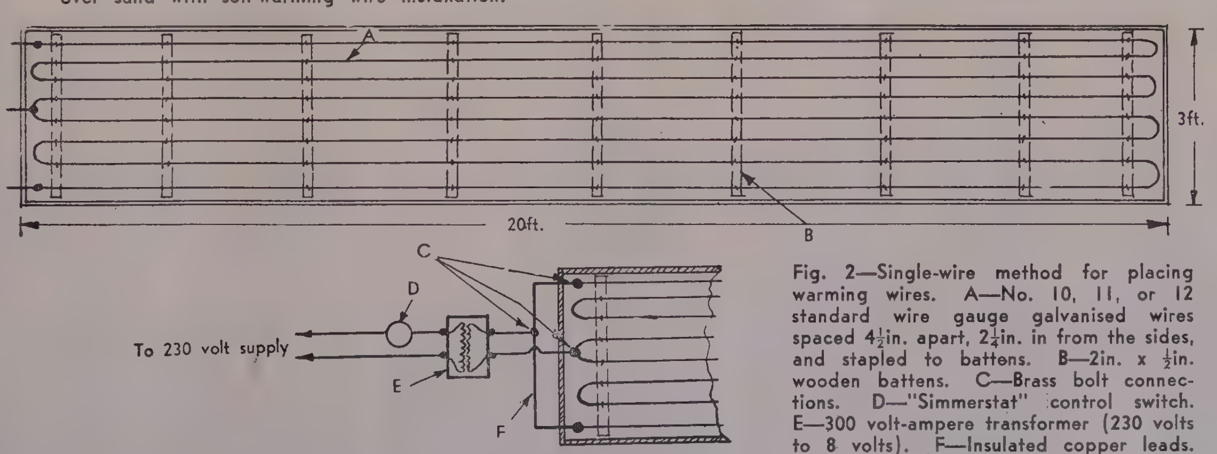

Fig. 2—Single-wire method for placing warming wires. A—No. 10, 11, or 12 standard wire gauge galvanised wires spaced 4½in. apart, 2¼in. in from the sides, and stapled to battens. B—2in. x ½in. wooden battens. C—Brass bolt connections. D—"Simmerstat" control switch. E—300 volt-ampere transformer (230 volts to 8 volts). F—Insulated copper leads.

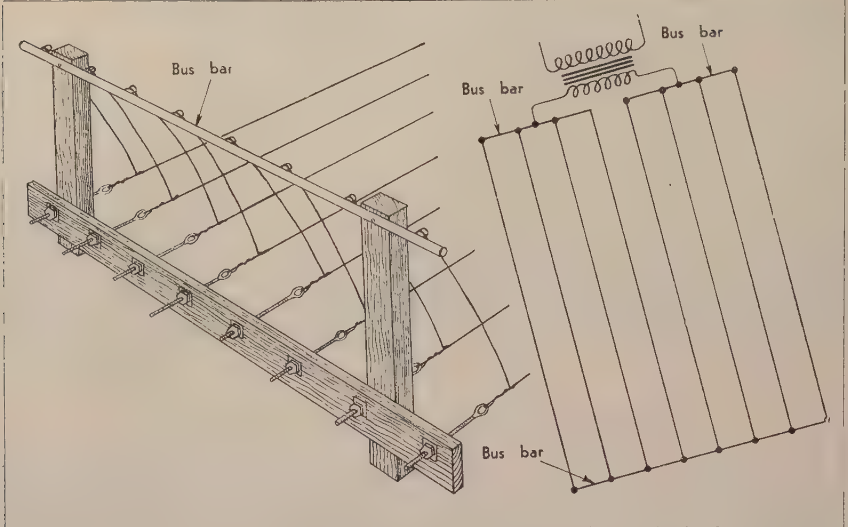

Fig. 3—The grid system of placing warming wires. Left—The method of tensioning. Right—Plan of the system.

Fig. 2 shows the single wire method for placing warming wires with a diagram of some of the equipment.

Fig. 3 shows the grid method for placing warming wires and the tensioning system.

Without the cost of erecting the frame, the approximate cost of the equipment shown in Fig. 2 would be as follows:—

| | £ | s. | d. |
|---|---|---|---|
| 2 to 3 cub. yds. of sand | 2 | 10 | 0 |
| 300 watt. transformer .. | 16 | 0 | 0 |
| Intermittent switch .. | 1 | 10 | 0 |
| Wires, battens, staples, etc. .. .. .. | 1 | 10 | 0 |
| | £21 | 10 | 0 |

The electrician's charges may vary considerably. If power has been already installed in the glasshouse for other purposes, the electrician's charge should approximate £5. If, however, a new circuit has to be run, the cost would have to be estimated for the individual jobs.

The propagating bed shown in Fig. 2 would consume about 2.5 units a day.

### References

"Simplified Electrically Heated Hotbeds", British Electrical and Allied Industries Research Association's Technical Report W/T7, by C. A. Cameron-Brown and E. W. Golding.

"Electrical Pre-warming of Tomato House Soil", British Electrical and Allied Industries Research Association's Technical Report W/T15, by C. A. Cameron-Brown and E. W. Golding.

"Journal of the Institution of Electrical Engineers", Vol. 95, Part II, No. 46, August 1948, page 423, "The Application of Electricity to Horticulture", by C. A. Cameron-Brown and E. W. Golding.

# Meteorological Records for June

| Station | Height of station above M.S.L. (ft.) | Air temperatures in degrees (Fahrenheit): Approx. mean | Difference from normal | Absolute maximum and minimum: Maximum | Minimum | Rainfall in inches: Total fall | No. of days of rain | Difference from normal | Maximum fall: Amount | Date | Bright sunshine hours |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Kerikeri .. .. | 201 | 54.0 | + 1.9 | 69.2 | 34.7 | 5.73 | 25 | — 1.35 | 2.08 | 8 | 127.8 |
| Auckland .. .. | 160 | 55.2 | + 2.2 | 67.3 | 42.7 | 7.11 | 20 | + 1.72 | 1.42 | 8 | 94.9 |
| Tauranga .. .. | 10 | 51.0 | + 1.1 | 64.4 | 31.2 | 5.30 | 15 | — 0.25 | 1.10 | 6, 9 | 133.0 |
| Ruakura .. .. | 131 | 49.2 | + 1.7 | 63.0 | 24.8 | 8.37 | 22 | + 3.59 | 1.57 | 6 | 84.6 |
| Rotorua .. .. | 969 | 48.5 | + 2.1 | 62.3 | 28.8 | 8.52 | 18 | + 3.20 | 2.88 | 9 | 87.7 |
| Gisborne .. .. | 12 | 51.0 | + 1.7 | 68.2 | 30.2 | 8.31 | 16 | + 4.10 | 3.17 | 9 | 108.2 |
| New Plymouth .. | 160 | 51.3 | + 1.2 | 61.5 | 32.5 | 7.22 | 21 | + 1.04 | 2.91 | 16 | 77.5 |
| Napier .. .. | 5 | 50.1 | + 1.4 | 66.9 | 30.4 | 6.88 | 12 | + 3.82 | 2.63 | 9 | 104.2 |
| Kariol .. .. | 2125 | 43.5 | + 2.0 | 57.0 | 25.0 | 3.45 | 23 | — 1.65 | 0.56 | 23 | |
| Wanganui .. .. | 72 | 50.4 | + 1.6 | 63.2 | 34.7 | 3.25 | 21 | — 0.14 | 0.43 | 23 | 67.7 |
| Palmerston North . | 110 | 48.4 | + 1.4 | 63.0 | 29.8 | 2.58 | 20 | — 1.77 | 0.41 | 13 | 61.4 |
| Waingawa .. .. | 350 | 46.3 | + 0.9 | 63.8 | 26.0 | 10.91 | 23 | + 6.82 | 4.79 | 10 | 74.5 |
| Wellington .. .. | 415 | 47.9 | + 0.2 | 58.6 | 35.1 | 9.90 | 18 | + 5.25 | 1.62 | 24 | 65.9 |
| Nelson airfield .. | 5 | 45.6 | + 1.5 | 61.1 | 27.8 | 5.22 | 14 | + 1.93 | 1.21 | 23 | 118.3 |
| Blenheim .. .. | 12 | 46.0 | + 0.6 | 63.5 | 29.0 | 4.34 | 15 | + 1.86 | 0.97 | 20 | 128.0 |
| Hokitika .. .. | 12 | 45.2 | + 0.9 | 64.7 | 29.2 | 6.39 | 13 | — 2.44 | 1.29 | 3 | 133.6 |
| Hanmer .. .. | 1225 | 39.0 | — 0.7 | 64.0 | 20.0 | 5.86 | 19 | + 2.37 | 1.31 | 10 | 84.4 |
| Christchurch .. | 22 | 43.8 | + 0.6 | 63.3 | 27.4 | 1.38 | 11 | — 1.21 | 0.47 | 20 | 94.8 |
| Ashburton .. .. | 323 | 41.6 | — 0.2 | 62.4 | 24.2 | 1.31 | 12 | — 1.29 | 0.41 | 17 | 87.9 |
| Timaru .. .. | 56 | 42.0 | — 0.4 | 55.2 | 26.2 | 0.39 | 8 | — 1.48 | 0.16 | 17 | 113.1 |
| Alexandra .. .. | 520 | 35.8 | — 1.9 | 54.9 | 19.0 | 0.67 | 11 | — 0.12 | 0.38 | 26 | 84.5 |
| Taieri .. .. | 80 | 39.2 | — 2.6 | 59.6 | 20.1 | 1.47 | 12 | — 0.85 | 0.50 | 26 | 104.1 |
| Invercargill airfield | 0 | 39.0 | — 2.6 | 55.6 | 21.0 | 1.84 | 14 | — 1.81 | 0.50 | 28 | 81.2 |

# Co-operative Hybrid Maize Tests

THE value of hybrid types of maize in Europe and the Mediterranean area has been demonstrated since the war. A recent report* published by the Food and Agriculture Organization of the United Nations summarises the results of trials carried out in 21 countries during 1950.

Practically all the hybrids tested that year were of American origin, and most gave yields higher than those of the best local open-pollinated varieties. The trials have shown the importance in many countries of such factors as maturity, resistance to cold, drought, wind, diseases, and insect pests, as well as yielding ability.

Several of the hybrids under trial have also been tested in New Zealand with similar results in regard to relative maturities and relative yields.

The later maturing hybrids, such as US 13, do not regularly develop to full maturity under the climatic conditions of the recognised maize growing districts of New Zealand. The earlier-maturing varieties such as W. 240, W. 255, and W. 275 are unable to take full advantage of the growing period in these districts, and yield poorly in comparison. Whether these earlier-maturing types have any place in districts more southern than Poverty Bay and northern Hawkes Bay will depend chiefly on two factors—the risk of unseasonable frosts, and the economic relationship between maize and other grain crops. Some pilot plots were sown in Marlborough last season and will be repeated next season to gain information on these points.

—*J. H. CLARIDGE*

*** Co-operative Hybrid Maize Tests in European and Mediterranean Countries—1950. FAO, Rome. 2s. 6d.**

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# Radio Broadcasts to Farmers

RADIO broadcasts to farmers will be given as follows during September:—

**1YA Auckland, 7 p.m.**

2 September—"Discussion on Bloat Prevention", by I. G. Watt, Livestock Superintendent, and E. H. Arnold, Assistant Fields Superintendent, Department of Agriculture, Auckland.

9 September—"Rush Control", by A. V. Allo, Instructor in Agriculture, Department of Agriculture, Tauranga.

16 September—"Care of Sheep Skins", by D. G. Austin, Sheep and Wool Instructor, Department of Agriculture, Auckland.

23 September—"Problems in the Home Orchard", by L. R. Renouf, Horticultural Instructor, Department of Agriculture, Auckland.

**2XP New Plymouth, 8 p.m.**

10 September—"Is Lime Necessary for Taranaki Soil?" A farmer discusses this point with A. C. Burgess, Instructor in Agriculture, Department of Agriculture, New Plymouth.

24 September—"What is Done to Assist Pig Producers", by C. M. Bailey, Supervisor, Taranaki District Pig Council.

**2ZA Palmerston North, 12.30 p.m.**

7 September—"Pigs, Seasonal Stock Notes", by D. R. Thomson, Livestock Instructor, Department of Agriculture, Palmerston North.

14 September—"Dairy Farm Pasture Management with the Electric Fence", by W. B. H. Smith, Fields Instructor, Department of Agriculture, Masterton.

21 September—"Vegetable Varieties for Manawatu Home Gardens", by B. P. Coleman, Horticultural Instructor, Department of Agriculture, Palmerston North.

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# Ruakura's Fifth Conference and Field Day

EVER since the Department of Agriculture's Ruakura Animal Research Station, near Hamilton, was established in 1939, farmers have shown an increasing interest in the work of the Station. From the end of the war the number of farmers wanting to visit the Station reached such proportions that research work was being seriously hindered by the demand on research workers to "drop tools" and explain what had been done and what work was in progress. In the words of the Superintendent of the Station, Dr. C. P. McMeekan: "If this goes on, we soon won't have anything to tell them".

TO overcome this difficulty it was decided to set aside one week in each year during which the efforts of the staff are devoted to holding an annual conference for farmers at a time of the year when most farmers would be able to attend. It was proposed to discuss at the conference the work of the Station in particular and of the Animal Research Division in general. In addition, other prominent agriculturists who had something of value to tell farmers would be invited to participate. So the first Ruakura Farmers' Conference was held in 1949. Each conference has been organised to cover the interests of both sheep and dairy farmers, one day being set aside for sheep farmers only, two days (including a field day at the Station) for both sheep and dairy farmers, and the final day for dairy farmers only.

From a relatively modest beginning at the first conference in 1949, when some 300 farmers attended, the interest has increased each year. Each conference has covered an ever-widening field. More and more farmers have attended. They have entered into discussion and argument to an increasing and stimulating degree.

The conference of this year was rated the best ever by enthusiasts who have attended all five. It attracted a record crowd; from 350 to 400 sheep farmers and 500 to 750 dairy farmers attended the day and evening meetings; at the field day there was a representative gathering which has been conservatively estimated at 1300. Though most came from the Auckland Province, practically every other part of New Zealand was represented. Visitors came from as far afield as Southland and Poverty Bay.

Papers and discussions at this year's Ruakura Farmers' Conference Week are being printed as

"Proceedings of the Ruakura Farmers' Conference Week 1953":

Price 10s., post free.

Those who paid conference fees will automatically be sent a copy. Others may order from the Department of Agriculture, Box 2298, Wellington.

Copies of the "Proceedings" for 1950, 1951, and 1952 are still obtainable, price 10s., post free.

## Increased Sheep Farmer Interest

A particularly pleasing feature was the marked increase in the numbers of sheep farmers over those of past years. The Waikato does not normally rank in popular opinion as a sheep-farming area, and the name of Ruakura is more commonly associated in farmers' minds with dairy cattle. The increasing contributions of the Station workers to problems of the sheep industry, however, are being recognised. The development of Ruakura's new Hill Country Research Station on the Raglan hills has probably contributed to this situation. Whatever the cause, the fact that the conference resulted in probably the largest gathering of sheep farmers ever held in New Zealand for educational purposes augurs well for the future of this class of farming.

The organisation of a successful conference of this type is not easy. The staff of Ruakura received many congratulations on the very good job done. In particular, farmers were impressed with the way in which the field day was handled. Anyone who has attended a farm demonstration at

HEADING PHOTOGRAPH: Although nearly a thousand dairy farmers attended the field day, there were seldom more than 30 or 40 at each of the major demonstration points. Continuous lunch at a mobile milk bar allowed each group time off for discussion.

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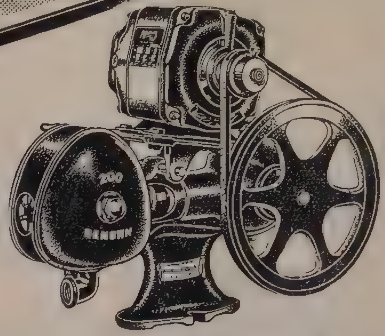

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*Bush and bog discing, logging, topdressing, driving a sawmill, harvesting and every conceivable kind of farm work.*

*Benzine consumption:* $\frac{1}{2}$ - $\frac{3}{4}$ *gallon per hour for all work. I also use a Grader Blade for clay roads on my farm, which exceed one mile. The Brown starts instantly and is generally very satisfactory.*

*A. D. Menzie, Otorohanga.*

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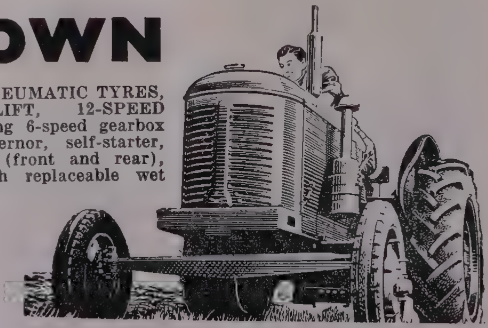


Part of the No. 1 dairy herd at Ruakura, which this year produced 350lb. of butterfat per acre.

any State or College institution in New Zealand has experienced the very great difficulty associated with the presence of a large crowd. It is almost impossible for groups larger than 40 or 50 farmers to get very much out of such field days. With crowds larger than this it is seldom possible for more than a few to hear and see a speaker demonstrate his work. In consequence, such field days have usually become little more than a pleasant walk around the farm. In the past Ruakura's field days have been no exception to this and have satisfied neither staff nor visitors.

## Field Day on U.S. Model

On this occasion a completely new approach to the problem was tried out. When Dr. McMeekan attended the Sixth International Grassland Congress at Pennsylvania State College in the United States last year he was impressed with the way in which the College authorities handled a field day on a property little larger than Ruakura. Over 14,000 farmers visited the college farm that day. Self-explanatory demonstrations had been arranged at twelve main centres on the farm. Each centre dealt with a particular group of problems. Thus, one handled problems of feeding dairy cattle; another dealt with fertilising pastures. In all they covered the major research activities of the institution. The field day began at 9 o'clock in the morning and continued all day. Farmers arrived at any time to suit their convenience. They parked their cars at a central point, from which they boarded one of a fleet of buses which circulated continuously around a fixed route, connecting all twelve demonstration points. Visitors could leave or board a bus at any point, so that they could both select the particular demonstration or demonstrations in which they were most interested and see as much or as little of it as they desired. Milk bars en route provided refreshments continuously. College staff were available at each point for answering questions and giving additional information. The whole principle behind the technique was one of movement, under which the crowd was kept flowing round the farm in an unhurried but effective stream.

Ruakura decided to try this system at its last conference. Despite the misgivings of many, both on the staff and on the organising farmers' committee, it worked. Apart from a few minor difficulties, due mainly to lack of experience of the staff in running the system and of farmers in fitting into it, a field day resulted which was rated as easily the most successful ever held at Ruakura. Complimentary references were made on all sides by visitors who claimed that for the first time they really saw something of Ruakura as a farm and obtained some direct insight into the way in which the work is carried out.

## Demonstration Points

Although nearly a thousand dairy farmers were catered for during the day, there were seldom more than 30 or 40 at each of the major demonstration points.

First stop was No. 1 Dairy, where a continuous demonstration on the servicing of a milking machine was available. In addition, the route

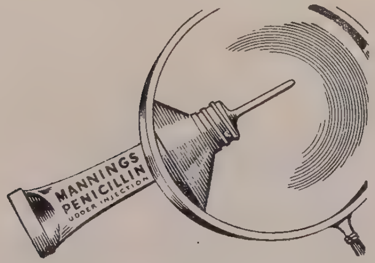
BELOW: No. 1 dairy shed and yards at Ruakura.

MANNINGS
PENICILLIN
UDDER INJECTION

**MANNINGS**

LONG-ACTING
PROCAINE
PENICILLIN

WITH THE NEW THIN
SMOOTH NOZZLE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PENICILLIN
UDDER INJECTION

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Remember that, whatever their natural productive capacity, your cows will only produce to the full if their protein feed is ample for the job.

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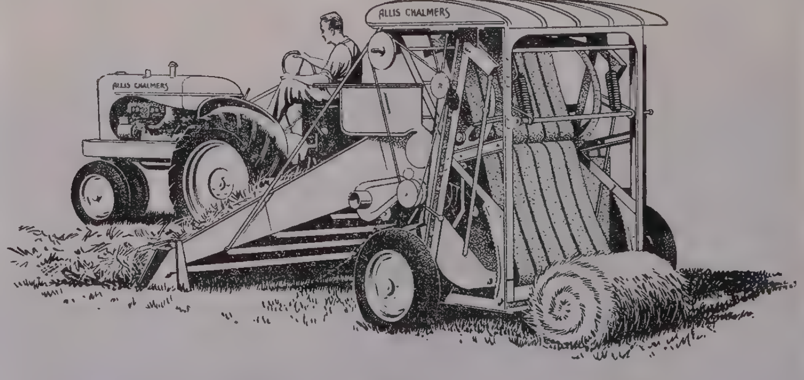
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passed through the centre of No. 1 dairy farm and passed the herd, so that some idea was obtained of the pastures and cattle that had resulted in a production of 350lb. of butterfat per acre from this particular unit during the current season. Details of these productions were available for inspection at the centre.

At the No. 2 unit farmers sufficiently interested in pigs to decant from the buses which stopped every 10 minutes were able to see a well-organised demonstration on three phases of Ruakura's pig work. The demonstrations covered methods of reducing pig losses, of increasing the prolificacy of sows, and of increasing efficiency in the use of feed. The newly designed Ruakura round house for farrowing was a key feature, attracting great interest.

At the Fertility Centre a wide range of activities on artificial breeding and male and female sterility was illustrated. The team of young bulls to be used in next year's artificial breeding work were lined up and their pedigrees and production backing plainly illustrated.

The fourth stop enabled an inspection to be made of well and poorly reared calves and heifers resulting from controlled and uncontrolled systems of grazing management. Here also the design of the long-term dairy cow nutrition experiment, planned to obtain data on the effect on lifetime production of four systems of feeding dairy stock, was plainly illustrated in chart form. Results to date were also shown.

At the next centre a representative of the Grasslands Division of the Department of Scientific and Industrial Research was available to demonstrate and discuss the establishment and management of the modern high-pressure pastures being developed by that Division. A special area had been sown to provide a practical demonstration of the problems involved.

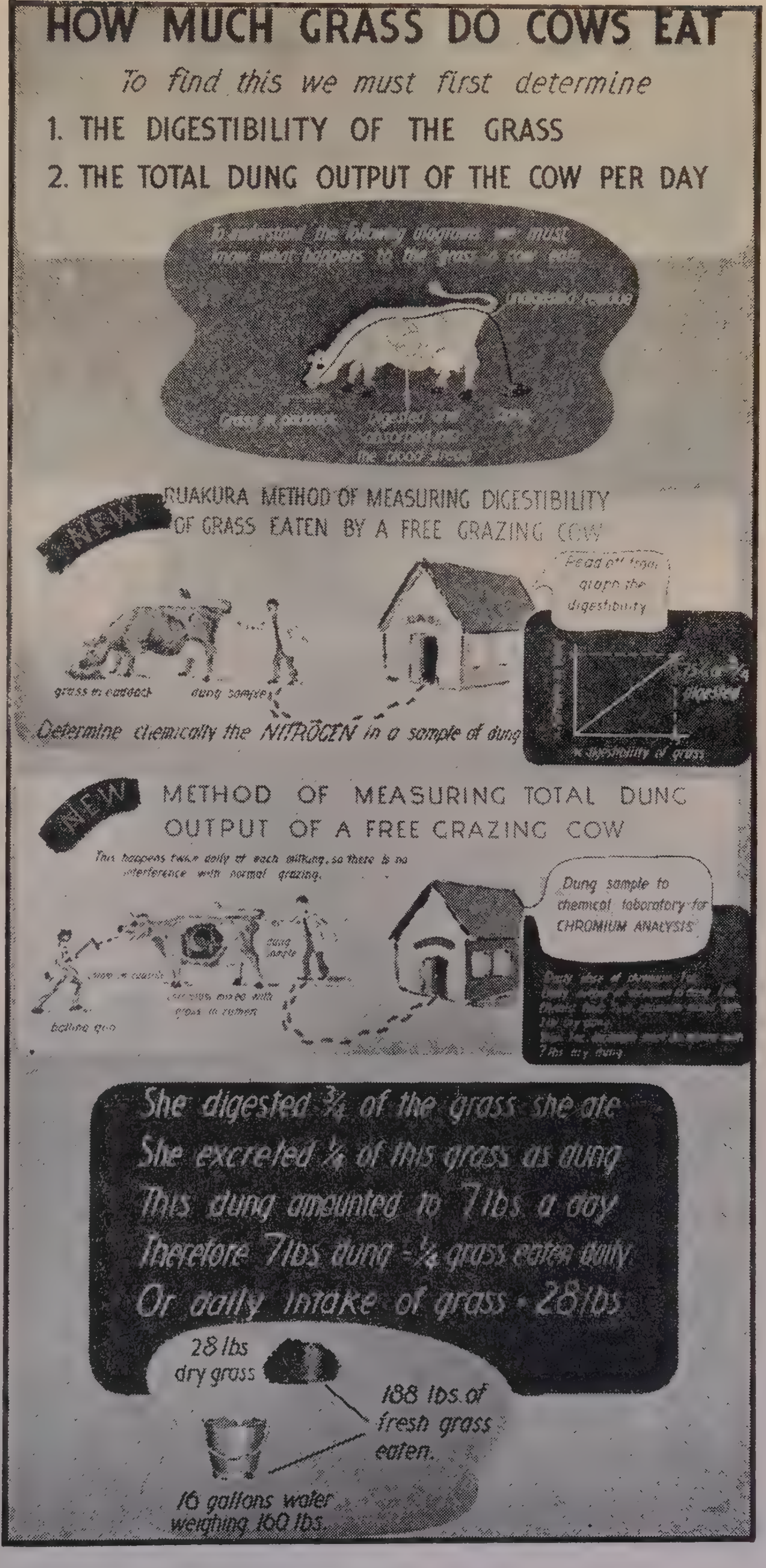
At the Nutrition Centre both animals and charts were employed to explain the way in which the modern scientist is attacking the special problems of pasture nutrition of dairy stock. Other charts and cattle drew attention to some of the results obtained and emphasised the importance of size of cow as a factor in efficiency of production on grassland. Calf rearing, with special reference to Ruakura results on early weaning, was similarly illustrated by both stock and self-explanatory posters.

The last stop on the dairy unit was at the identical twin centre, where the use of identical twins in cattle research was explained and illustrated in a practical way.

Back at the parking centre the Ruakura Hall provided still further demonstrations of interest to both sheep and dairy farmers. Main topics were work on facial eczema, on fat lamb carcass quality, and on control of weeds by hormones. Inspection of this part of the proceedings was arranged to be fitted in with lunch from the mobile milk bar.

## Sheep-farming Group

It was unfortunate that the same technique was not employed in handling the specialised sheep-farming group, for which such a large crowd


HOW MUCH GRASS DO COWS EAT

To find this we must first determine

1. THE DIGESTIBILITY OF THE GRASS

2. THE TOTAL DUNG OUTPUT OF THE COW PER DAY

NEW RUAKURA METHOD OF MEASURING DIGESTIBILITY OF GRASS EATEN BY A FREE GRAZING COW

Determine chemically the NITROGEN in a sample of dung

Read off from graph the digestibility

NEW METHOD OF MEASURING TOTAL DUNG OUTPUT OF A FREE GRAZING COW

This happens twice daily at each milking, so there is no interference with normal grazing.

Dung sample to chemical laboratory for CHROMIUM ANALYSIS

She digested ¾ of the grass she ate

She excreted ¼ of this grass as dung

This dung amounted to 7lbs a day

Therefore 7lbs dung = ¼ grass eaten daily

Or daily intake of grass = 28lbs

dung sample
NEW
NEW
dung sample
7lbs dry dung
28 lbs dry grass
188 lbs. of fresh grass eaten.
16 gallons water weighing 160 lbs.

Dairy farming posters displayed at the conference.

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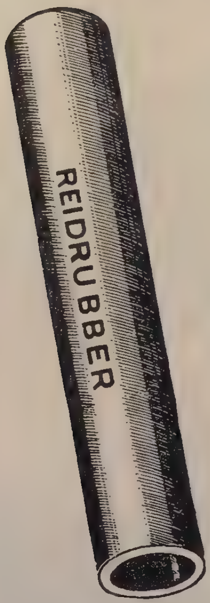

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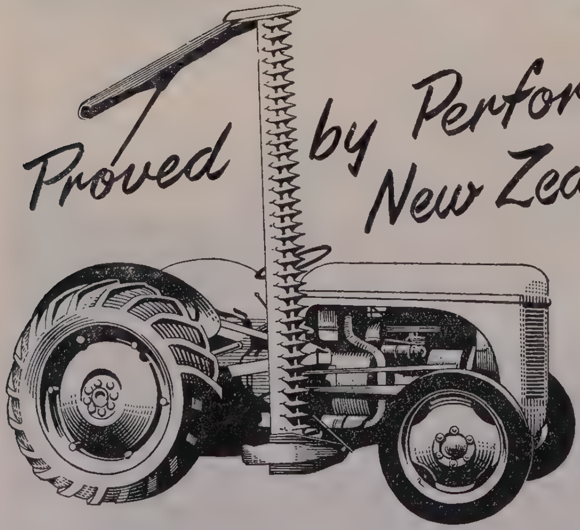

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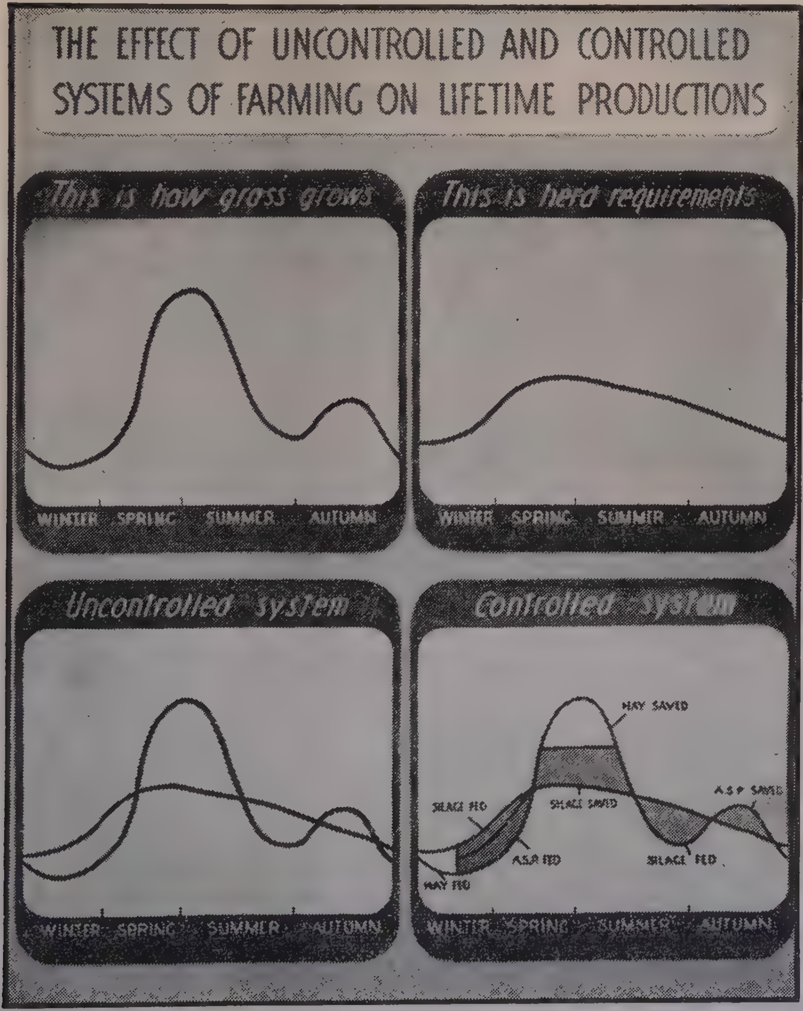
Laboratories, woolshed, and yards on the Ruakura Hill Country Research Station.



was not expected. Previous experience had indicated that it was quite practicable to handle the hundred or so visiting sheepmen in the normal manner. On this occasion, however, the sheep-farming crowd was approximately 350, and the contrast between the old and the new method of organising a field day was very obvious. It was impossible to demonstrate effectively the work of the Station on hogget rearing, on ewe management, and on fat lamb production to such a large number in one group. Even the voice of the Superintendent was not capable of reaching the extremities of the crowd in the open. Next year the sheep farmers will also move on the circulating pattern.

Despite the difficulties, however, the sheepmen were also extremely interested and pleased with their day. In addition to the three points already mentioned, they were specially appreciative of the practical demonstration of vaccination against scabby mouth and blood poisoning. The dwarf beef bull also attracted considerable attention, and farmers were able to feel for themselves the difference between normal and diseased rams suffering from abnormalities of the reproductive organs.

In the afternoon sheep farmers were taken to the Hill Country Station, where, despite the difficulties of transport arising from damage to roads during the wet winter, a very good idea was obtained of the many lines of work opening up on this property.

The Ruakura Farmers' Conference appears now to be an established part of the farming year in the North Island. The Ruakura workers hope that the crowds will not become any larger, but they have been tremendously encouraged by the increasing interest taken in their work. There is no doubt that direct contact between farmer and scientist in this way must react beneficially on the welfare of the primary industries of New Zealand.

# Aerial Control of Beetle Pest

By C. S. SMITH

AN aerial spraying campaign against cockchafer beetles recently concluded in Switzerland was an outstanding example of co-operation among farmers to make possible the use of the aeroplane for pest destruction. The cockchafer (*Melolontha melolontha* L.) has few natural enemies in Switzerland and is a very serious pest. Spraying from an aeroplane is the only practical means of combating it.

THE Rhone Valley in the Canton of Valais in the south of Switzerland is about a mile across at its widest and is 65 miles long. On both sides the Alps rise to 10,000ft., and except for terraced vineyards on the lower, south-facing slopes, cultivation is confined to the flat valley bottom. Conifers grow up to 2500ft. and oak, sycamore, willow, and poplar on the lower slopes. These trees become infested with cockchafers in flight years.

## Pest Attacks Roots of Crops

Crops are asparagus, corn, lucerne, potatoes, soft and stone fruits, and pasture. Soil is alluvial, coarse but alkaline, and deep but lacking body. In this light soil lives the larva or white grub of the cockchafer. For 3 years it devours the roots of crops, even of young fruit trees. It defies all efforts to eradicate it by soil fumigant and in winter it burrows down 12 to 30in.

When the sudden heat of spring sun warms the soil in the third year the larva, now a mature beetle, crawls to the surface and flies to the trees. There it mates, and the female descends to the ground again and lays the eggs (40 to 60 eggs per beetle in the few weeks of adult life) that will within a month or so turn into the white grubs that for another 3 years will plague the roots of crops. A population of 1,000,000 to 1 acre is not unusual.

## Air Spraying Only Control

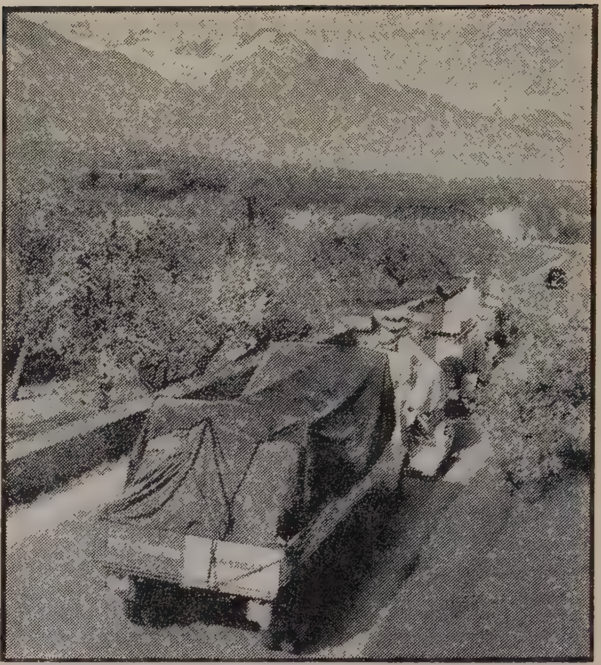
Formerly Swiss authorities paid a few centimes per litre to children for collecting the beetles, but year after year the larvae in the ground created havoc. It became apparent that the only way to tackle the cockchafer was when it was on the wing. Air spraying in the flight years, which can be predicted, was the only answer.

Three years ago the Swiss Government sought the help of Pest Control of Cambridge, England, and a contract was signed for helicopters and fixed wing aircraft to spray D.D.T. emulsion on the treetops. A kill of 50 to 90 per cent. was recorded.

The firm was invited again this year to spray against the cockchafer on a large scale. The farmers of the communes paid for the spraying on an acreage basis.

Five aircraft (two helicopters and three Auster machines) with all the ancillary equipment, including insecticide and fuel tankers, spares, and ground crews, had to be transported from England.

Spraying was generally done in early morning and late evening, when the still air would cause the emulsion to sink accurately on to the treetops. Six hours' spraying was about the daily average.



Equipment on the way to the operational area.

For smaller areas the helicopters, carrying 40 gallons of emulsion and having a swath width of 45 to 60ft. close over the treetops, were used. The Austers, carrying 60 gallons a trip and giving a swath width of 60 to 90ft. at 30ft. over the trees, did the larger areas. The average spraying per day was 1800 to 2000 acres.

## Successful Results

Results were impressive. Thousands of dead beetles darkened roads under the trees. The D.D.T. emulsion used is toxic whether it touches the beetles or whether they eat the sprayed tree foliage, and it remains toxic for about 14 days.

Switzerland has comparatively little land for growing crops. What there is has to be fully utilised. The cockchafer was a constant and growing menace. A Swiss agriculturist said, "We should have had to give up intensive agriculture in this valley if we had not been able to spray the cockchafer in this way".

Photographs by Pest Control Ltd.

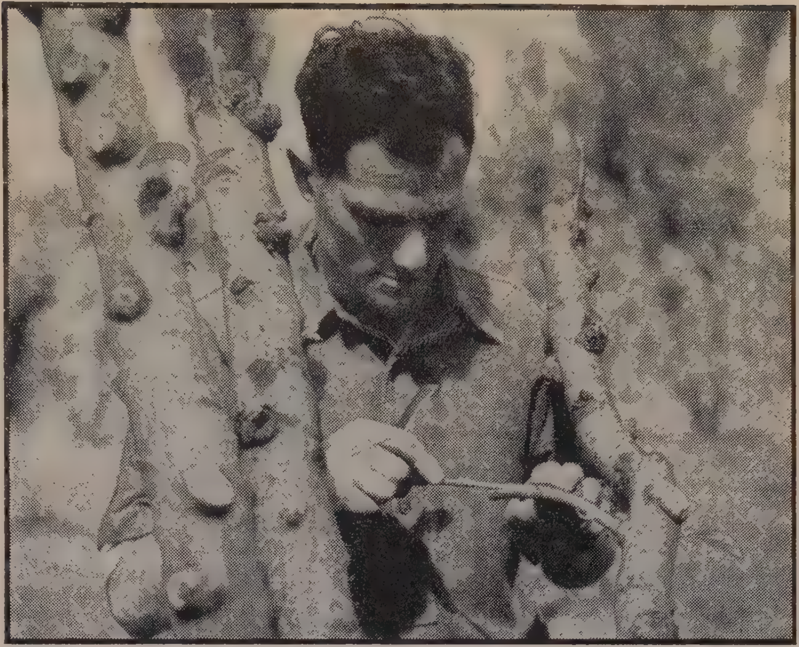
# The Home Orchard in Spring

THE art of grafting has been practised for ages. The people of the old world, although not fully understanding the science of the art as it is known today, were very adept in the practical work. Only modifications of the work have been evolved in later years, the principle remaining the same: That the cambium layers of both stock and scion must be placed in firm contact, as it is at that point that the union takes place through the formation of new cells. The requirements for successful grafting and other aspects of home orchard management in spring are discussed here by C. E. K. Fuller, Horticultural Instructor, Department of Agriculture, Hamilton.

HOME gardeners who are contemplating grafting should have the scions on hand in readiness for this work. Grafting may be done from about mid-September, when growth has begun and the sap is flowing freely. If grafting is done too early, the scions may fail to take, and if the work is delayed until the trees have reached the flowering stage, the scions may be "drowned" by the rush of sap and fail to make satisfactory growth.

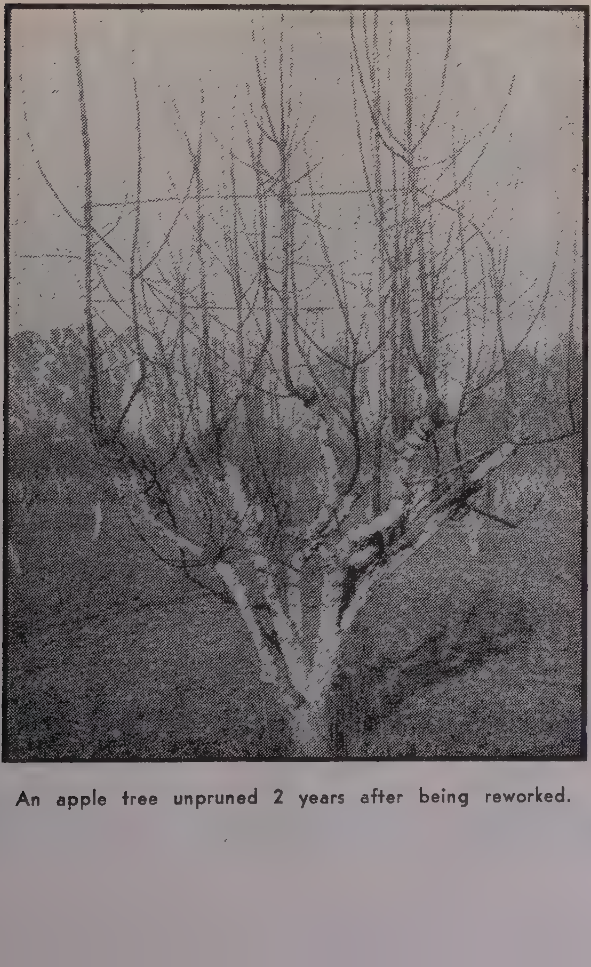
Grafting is a convenient method of reworking pip fruit trees with a more favoured variety or of growing several varieties on a single tree.

Stone fruit and citrus are generally reworked by budding, as grafting is more difficult and less successful, unless the operator is highly skilled.



[*National Publicity Studios photos.*

An apple tree being reworked to another variety. Most of the framework of the original tree is being retained.



An apple tree unpruned 2 years after being reworked.

Grafting is confined to plants which have a cambium layer beneath the bark layer, but botanical relationship is necessary for success, which is usually easy between varieties of the same species (for example, apple on apple) and closely related species (pear on quince); but strangely enough quince do not take on pear, and gooseberry thrives on black currant but not on red currant. Peaches and plums will grow one on the other. Incompatibility between varieties is not uncommon.

**Horticultural varieties may generally be intergrafted freely, species less freely, genera only occasionally, and plant families rarely.**

Stock: That portion of the tree which is retained and grafted. It furnishes the root system of the tree.

Scion wood: Mature, dormant shoots of the previous season's growth.

The scion: A section of 1-year-old wood containing one or more buds which is used for grafting on to the stock.

Cambium layer: The growing tissue of the tree, located between the wood and bark.

Suckers: New shoots arising below the graft.

Grafting: The process of inserting the scion into the stock.

## Trees Suitable for Grafting

Any variety of apple or pear which is strong and healthy is suitable for grafting. Weak, undernourished trees rarely do well, although scions of a vigorous growing variety such as Gravenstein may develop into a good tree.

Scions of about pencil thickness should be collected from 1-year-old wood (mature, dormant shoots of the previous season's growth) from mature, healthy trees of the desired variety during the dormant period of the tree at, or about, pruning time. Scion wood should not be gathered from prunings on the ground, but be taken direct from the tree, tied tightly in small bundles, and placed in a cool but moist position. The bundled scions will keep in good condition if placed upright with their bases in about 6in. of soil on the shady side of a building or thick hedge. The site should be protected from drying winds, but the heeled-in bundles should be open to the sky.

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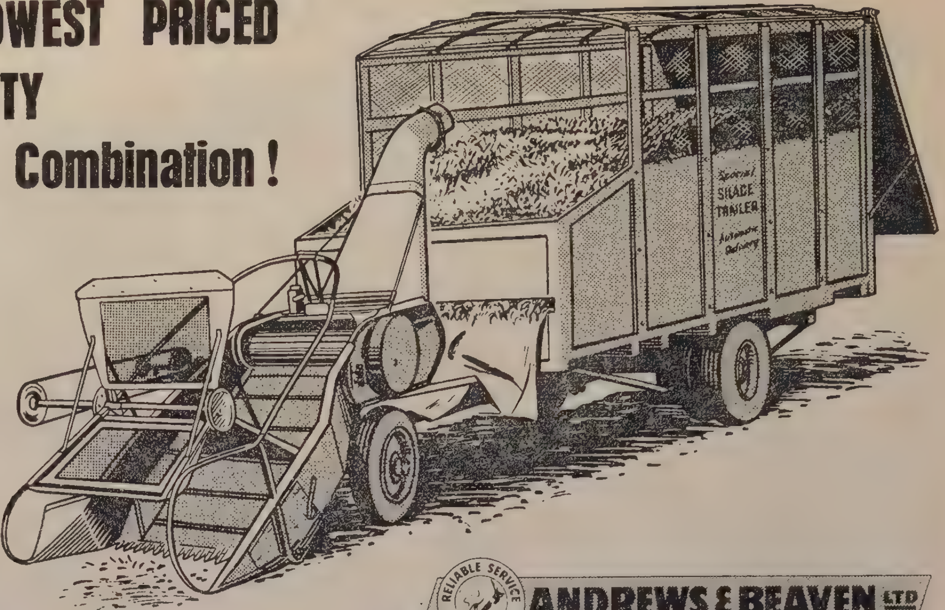

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The equipment necessary for successful grafting is a pruning saw, secateurs, a stout knife, raffia, shoemaker's tingles or tacks, a tack hammer, and sealing compound (grafting wax or green crude petrolatum).

## Kinds of Grafts

There are numerous methods of grafting, but only those considered most suitable for use by the home gardener are described.

**Whip-and-tongue graft** (upper left illustration on page 127): The most widely used type of graft for the propagation of apples and pears and other suitable subjects is the whip-and-tongue graft. Whip-and-tongue grafting is used to the best advantage when stock and scions are of equal diameter, but when the stock is larger the scion may be offset, care being taken that the cambium layers of both stock and scion are in contact at least along one side of the join. A flat, slanting cut, the length of which is about 4 to 6 times the thickness of the scion, is made at the basal end of the scion. A downward pointing tongue (A) is made in the upper half of this slanting surface. A slanting cut corresponding in length to that of the scion is made on the stock. An upward pointing tongue (B) is made in the upper half of this slanting surface. The cut surfaces of the scion and stock are placed together so that the tongues interlock (D) and the cambial regions (C) are in contact over as great a length as possible. Tying (E) and sealing of all exposed cut surfaces complete the operation.

## Bulletins for the Home Orchardist

**Free Bulletins**

Nos.

| | |
|---|---|
| 81 | The Budding of Pip and Stone Fruit Trees. |
| 101 | Cause and Control of Brown-rot in Fruit. |
| 104 | Silver Leaf in Orchards. |
| 112 | Powdery Mildew in the Orchard. |
| 135 | Passion Fruit Culture. |
| 285 | Grafting of Fruit Trees. |
| 306 | Tree Tomato Culture. |
| 310 | The Home Orchard. |
| 314 | Disinfection of Glasshouse Soil. |
| — | Bladder Plum and Its Treatment. |

The above bulletins, part of a series of over 350 on all aspects of farming, are available post free from the nearest office of the Department of Agriculture, or from the Head Office of the Department, Box 2298, Wellington.

**Topgrafting, topworking, or reworking** is the operation of cutting back the main branches of a tree and grafting another variety on it. The method may be so used by the home gardener that several varieties may be had on one tree. The whip-and-tongue method described may be used on

## Spray Applications for Insect Pest and Disease Control in Home Orchard

### Apples and Pears

| Time of application | Treatment | Pest or disease |
|---|---|---|
| Buds showing green tips | Bordeaux mixture (6oz. of bluestone, 5oz. of hydrated lime, 4 gallons of water), or lime sulphur (1¼ pints to 4 gallons of water) | Black spot |
| Petal fall | Lime sulphur (¼ pint) plus D.D.T. (50 per cent. wettable powder) (½oz.) to 4 gallons of water | Black spot, powdery mildew; codling moth, bronze beetle |
| *3 weeks later | Lime sulphur (¼ pint) plus lead arsenate (1¼oz.) plus hydrated lime (2oz.) to 4 gallons of water | Black spot, powdery mildew; codling moth, bronze beetle, leaf-roller caterpillar, leech |

* Repeat this spray at intervals of about 18 days until a month before the apples are ready to pick.

Bordeaux mixture at 3 : 4 : 50 strength (4oz. of bluestone, 5oz. of **fresh** hydrated lime, 4 gallons of water) may be used on pear trees in place of lime sulphur sprays.

In January or February it may be necessary to apply **summer oil** at ⅛ pint to 4 gallons of water to control red mites. Two sprays are needed 10 to 12 days apart. Oil sprays must not be applied closer than 14 days before or after sulphur sprays.

### Stone Fruits (Except Apricots)

| Time of application | Treatment | Pest or disease |
|---|---|---|
| Bud movement of leaf buds | Bordeaux mixture (6oz. of bluestone, 5oz. of hydrated lime, 4 gallons of water) | Leaf curl, shot hole, bladder plum, brown rot |

Repeat in 7 to 10 days at 4oz.-5oz.-4 gallons strength on varieties where leaf curl is particularly severe.

| | | |
|---|---|---|
| Before blossoms fully open | Lime sulphur (¼ pint to 4 gallons of water) | Brown rot, shot hole, leaf rust |

Repeat at intervals of 3 to 4 weeks up to 3 weeks before picking.
Where leech is troublesome apply D.D.T. (50 per cent.) at ½oz. to 4 gallons of water.

### Citrus Trees

| Time of application | Treatment | Pest or disease |
|---|---|---|
| Petal fall of main blossom | Bordeaux mixture (4oz. of bluestone, 5oz. of hydrated lime, 4 gallons of water) | Verrucosis and other fungous diseases |

Spray in October, November, and December with the same mixture if verrucosis has been troublesome.

| | | |
|---|---|---|
| Early February | Summer oil (1 pint to 4 gallons of water) | Scale insects, sooty mould |
| Late May | Bordeaux mixture (as above) plus summer oil (as above) | Brown rot, hard wax scale |

Repeat Bordeaux mixture spray at any time during winter and spring if brown rot appears.

If aphis is present, nicotine sulphate (6 teaspoons in 4 gallons of water) should be added.

Copper compounds such as "Cuprokylt", "Cuprox", "Oxicop", and "Perenox" at 3oz. to 4 gallons of water are satisfactory substitutes for Bordeaux mixture in most circumstances. When these materials are used on stone fruit trees at the bud movement period or on pip fruit trees at the green tip period the concentration of any of them should be increased to 4oz. in 4 gallons of water.

### Grapes

| Time of application | Treatment | Pest or disease |
|---|---|---|
| 2 weeks before bud burst | Lime sulphur (2 pints in 4 gallons of water) | Erinose mite, lecanid scale; powdery mildew |
| *When shoots are 2 to 4in. long | Copper compounds such as "Cuprokylt", "Cuprox", "Oxicop", and "Perenox" (3oz. in 4 gallons of water) | Downy mildew, black spot |
| | Plus lead arsenate (1oz.) added to above spray | Leaf-roller caterpillar, grapevine moth, grapevine weevil |

* Repeat at 14-day intervals up to colour change of fruit.

Where powdery mildew is troublesome dust with flowers of sulphur 4 to 6 times during the growing period.

If mealy bug or thrips are troublesome, use D.D.T. wettable powder (50 per cent.) at ½oz. to 4 gallons of water in place of lead arsenate.

### Orchard Hygiene

As prunings are potential hosts for disease, they should be picked up from beneath the trees and destroyed by burning.

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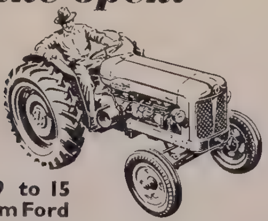

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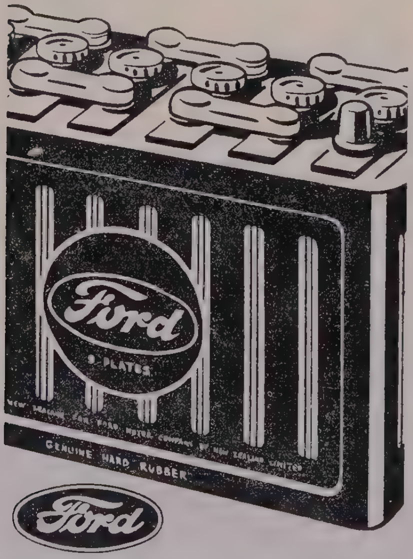

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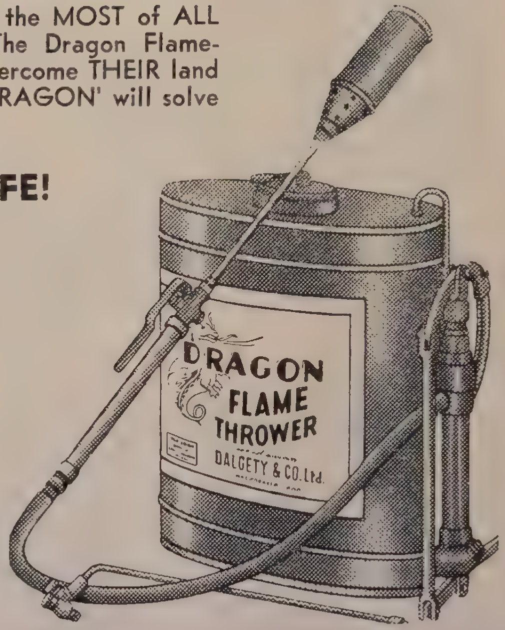

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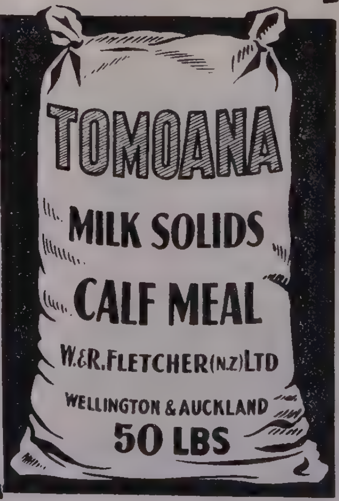

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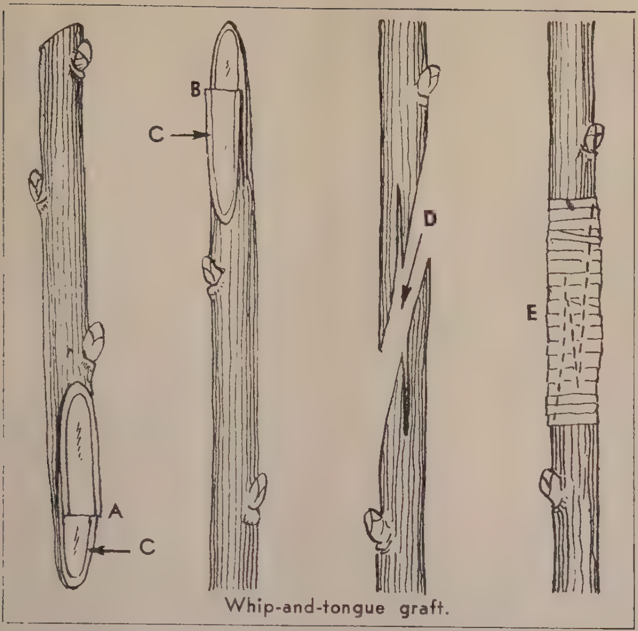


Whip-and-tongue graft.

Two of the grafts described ready to be tied or tacked and sealed. Left—Whip-and-tongue graft. Right—Crown, bark, or rind graft.

small branches of the stock (smaller than 1in. in diameter).

**Crown, rind, or bark graft** (illustration at right): This graft is generally used on trees beyond the nursery stage or on mature bearing trees on branches too thick for whip-and-tongue grafting.

The sawn ends of the stock limbs should be pared smooth first.

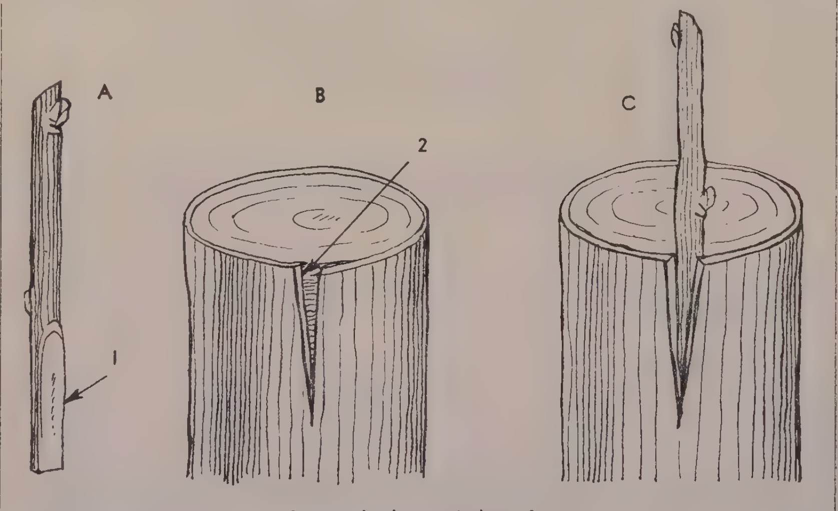
The scion (A) is cut on a long slant and one edge (1) of the bark is cut to make a close contact with the bark of the stock (B2) when the scion is inserted between the bark and the wood on the stubs of the cut-off limbs. The knife cut on the stock (B2) should be made vertically into and through the bark but not into the wood. If necessary, the bark may be lifted to one side. The scion should be pushed down beneath the bark so that the cut portion fits closely against the wood and the bark at 2. The bark and scion should be tied tightly or a tack should be driven through them. The affected parts should be covered with a sealing compound when the scion is in position as shown in C.

One or more of these grafts may be used on each stub, depending on its size.

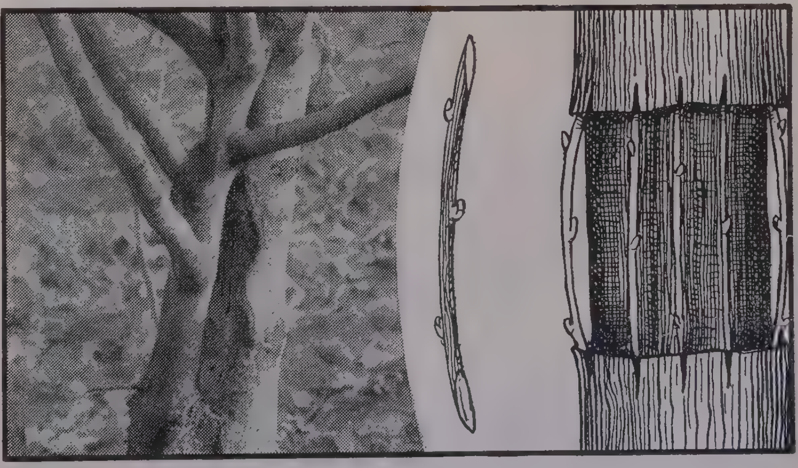
## After-care

The sealing compound should be checked regularly for cracks and other damage, and at the same time any suckers should be removed which are arising from the stock and competing with the scion. On topworked trees any such growths growing well away from the scions may be left, or merely shortened, to give the tree a little leafage until foliage develops from the scions.

Where necessary the grafts should be given mechanical support from wind damage, as they are likely to become top-heavy once they have taken and are making growth. A graft cannot be considered to have united with the stock until good growth is arising from it. Once the graft has taken the ties should be cut by lightly running a knife over the raffia, where possible on the side away from the graft union. The tie should not be



Crown, bark, or rind graft.



Bridge graft.

removed immediately it is cut, but should be allowed to fall away as the scion develops.

### Grafts for Special Purposes

**Bridge grafting** (bottom illustration on page 127) is the operation of connecting the cambium above and below damaged portions of trunks or limbs of trees damaged by cats, opossums, rabbits, and other animals. The bridge is made by the use of supple scion wood of lead-pencil thickness and 3 or 4in. longer than the width of the damaged area.

All damaged tissue should be removed, the upper and lower edges of the wound being cut back evenly to live, healthy bark and the exposed area covered with a suitable wound dressing.

The scions should be cut at both ends with sloping cuts about 1½in. long as for rind or bark grafts.

Vertical cuts should be made through the bark on the stock at opposite points, the bark lifted, and the **lower end** of the scion slipped under the bark at the lower end of the wound; the upper end of the scion is placed similarly, the scion being slightly sprung in the middle. The bark and scions should be tacked into position and the affected parts covered with a sealing compound. More than one scion may be used if necessary.

## Routine Work

### Cultivation

Deep cultivation should now have been completed. Light cultivation should be begun by hand hoeing around the trees as soon as the weather permits.

### Pruning

Pruning of stone fruit trees should be completed by the end of July and of pip fruit trees by the end of August.

It is generally believed that citrus trees do not require pruning, but some pruning, principally in the nature of moderate thinning, is recommended to prevent overcrowding of fruiting wood.

Citrus trees should not be pruned as heavily as pip and stone fruits. A moderate pruning in spring each year, enough to admit light and air for the proper development of shoots, buds, and fruits, is sufficient.

The principal points to be kept in mind when citrus trees are being pruned are:—

The encouragement of a sturdy framework of limbs by the judicious thinning out or shortening of less desirably placed branches.

Keeping lower branches clear of the ground.

Shortening excessively long side or top branches.

Thinning out weak or spent fruiting wood, especially from lemon trees.

Refraining from pruning out healthy branches carrying good foliage unless it is absolutely necessary.

### Manuring

Manures for different fruits and the rate of application are as follows:—

**For apples, pears, apricots**
**Parts (by weight)**

2 of blood and bone
2 of superphosphate
1 of sulphate of ammonia
1 of sulphate or muriate of potash

**For peaches, plums, citrus, sub-tropicals**
**Parts (by weight)**

2 of blood and bone
1½ of superphosphate
1 of sulphate of ammonia
1 of sulphate or muriate of potash

**Rate of application:** For trees not yet in bearing from 1 to 3lb. should be sufficient; for bearing trees the quantity may be increased, up to 15lb. for large, heavy-bearing trees. A dressing of 10lb. would be sufficient for bearing trees of average size. The manure should be hoed in.

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## *National Film Unit's*

# "Farming in New Zealand"

FOR its fairly short length—just less than 1000ft.—"Farming in New Zealand", a 16mm. colour film recently made by the National Film Unit for the Department of Tourist and Publicity, gives a remarkably comprehensive picture of the main primary industries in New Zealand. It has been made principally to attract farmer tourists from overseas, particularly from Australia, but it has much to offer New Zealand audiences, who will have opportunities of seeing copies ordered by film libraries in New Zealand.

THE film shows the diversity of the Dominion's livestock farming and deals in detail with lamb fattening, dairying, and small seeds production. The importance of pasture management and the development of mechanisation in many farming operations are emphasised.

The farmlands filmed are typical of most farming districts, ranging from lush river flats to high tussock country, and in all scenes the rich colours of summer and autumn form an impressive background for the photography. Different parts of the film were taken in the Gisborne district, the Mackenzie Country, and the Wairarapa, near Tirau and Hastings, and around Timaru. Some of the shots, such as aircraft in flight topdressing hill country and the approach of rain clouds along the hills in the Tai Tapu district, are unusual and spectacular.

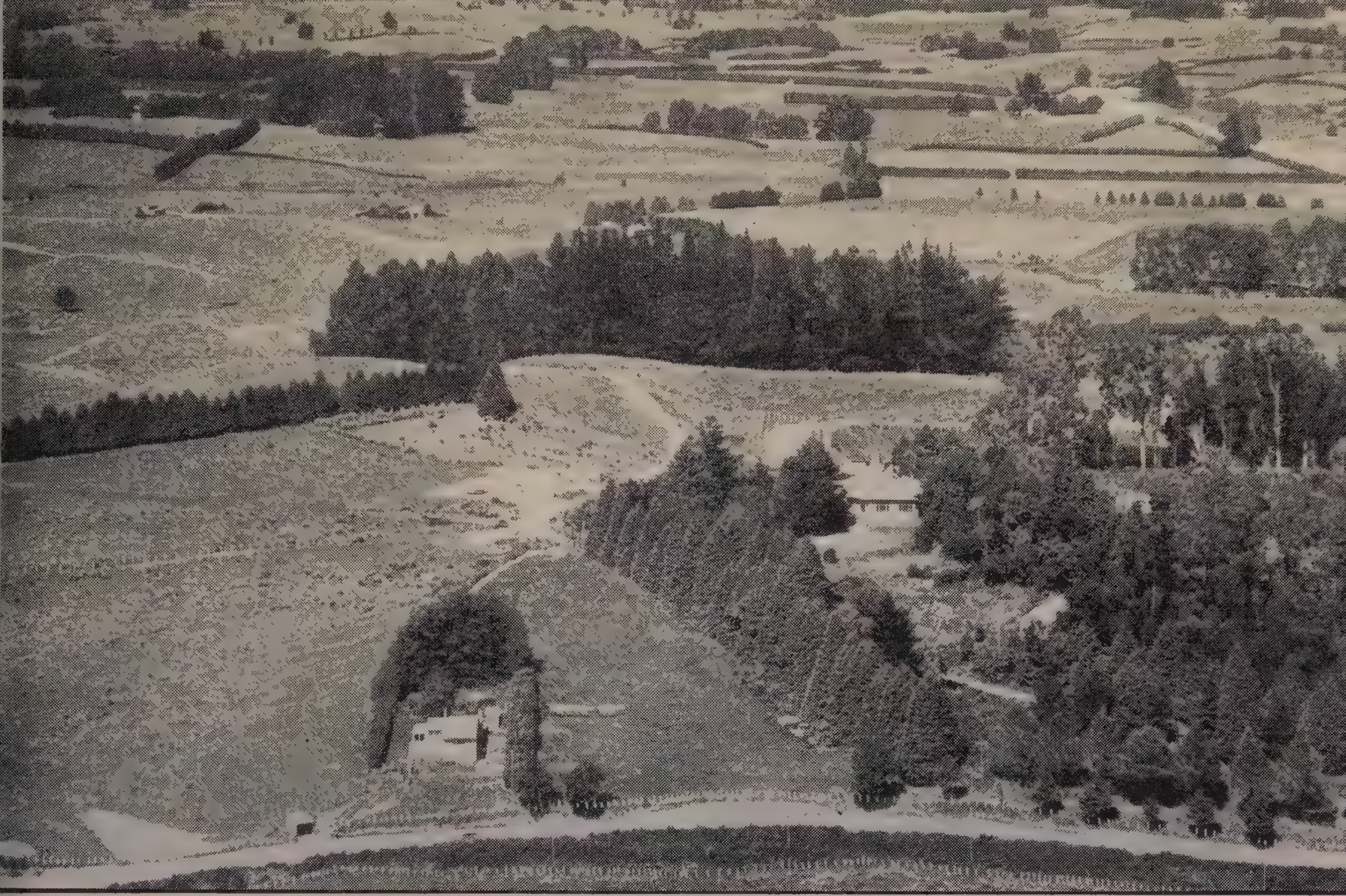
Though the New Zealand farmer, his family, and farm help have the chief parts in the film, tribute is paid to those other people—the research and extension workers and agricultural teachers—who are continually guiding and assisting farmers and encouraging them to reach higher standards of production and efficiency. This work is exemplified in the film by views of the certification and testing of seeds and of trials being carried out to evolve new and better strains of grasses for pasture establishment.

AT LEFT—Farmhouse and buildings on a Wairarapa hill-country farm on which part of "Farming in New Zealand" was filmed.

The commentary of "Farming in New Zealand" is well written and presents facts and figures interestingly and concisely. The showing time of the film is 27 minutes.

### CHANGES OF ADDRESS OF "JOURNAL" SUBSCRIBERS

To ensure continuity of delivery of issues of "The New Zealand Journal of Agriculture", subscribers are required to give 4 weeks' notice of change of address. The old address (preferably an address label clipped from a recent "Journal" wrapper) and the new address should be sent to the nearest office of the Department of Agriculture.



# Ninety Years' Development in Matamata Farming

By G. A. BLAKE, Instructor in Agriculture, Department of Agriculture, Matamata

IN the 1870s owners of some of the large estates in the South Island were breaking in the better class country and taking profitable crops of turnips and grain off it. But discouragement and expense were the lot of settlers in the Matamata district who, thinking their land was similar, tried the same practices there. Large companies borrowed heavily from the Bank of New Zealand to develop this Waikato country, but they and the bank itself were in difficulties in the depression of the 1880s and early 1890s. During the operations of the Assets Realisation Board, which was formed to reorganise the estates, the importance of topdressing grass was discovered. This article describes a fully developed farm of about 300 acres which was part of the Mangapouri Block taken over by the Government from the Assets Realisation Board in 1906 and thrown open for selection the following year. Brief histories of the settlement of the district and the operations of the large estates form a background for the picture of the evolution of this Waikato county from frustration and disaster during its development as large estates to realisation of its great production potential after subdivision and the adoption of the new grassland farming practices.

## SETTLEMENT OF MATAMATA

THE settlement of the Matamata district dates back to 1866, when, soon after the conclusion of the Waikato War, Josiah Firth made an agreement with the Arawa tribe to take over a large block of land in the locality. The Native Lands Act of 1865 had made it possible for land to be bought from the Maoris by direct negotiations and soon some other large blocks were taken up in the southern Waikato; the land itself was covered in fern and scrub and only those with plenty of capital could afford to do much with it.

In the 1870s and 1880s the owners of some of the large estates in the South Island were breaking in the better class country and taking crops of turnips and grain off it. For some years this proved very profitable and naturally attention was directed to the large areas of fairly easy country in the Waikato which bore a sufficient resemblance to those in the south. But all attempts to break in the land, raise crops, or sow it down in grass proved discouraging and expensive.

## Companies' Large Blocks

Apart from Firth's Matamata estate, other large blocks were held by the New Zealand Thames Valley Land Company, the Waikato Land Association, the Auckland Agricultural Company, the Bank of New Zealand Estates Company, and the Estates Branch of the New Zealand Loan and Mercantile Agency Company.

The Auckland Agricultural Company was formed in 1882 with a capital of £1,000,000 by Thomas Russell. He had come to New Zealand as a youth and qualified as a solicitor, but from 1860 he had devoted most of his time to other business interests and among other things was closely associated with the establishment of the Bank of New Zealand, the New Zealand Loan and Mercantile Agency Company, the New Zealand Insurance Company, and the Colonial Sugar Refining Company. Until 1882 he was John Grigg's partner at Longbeach.

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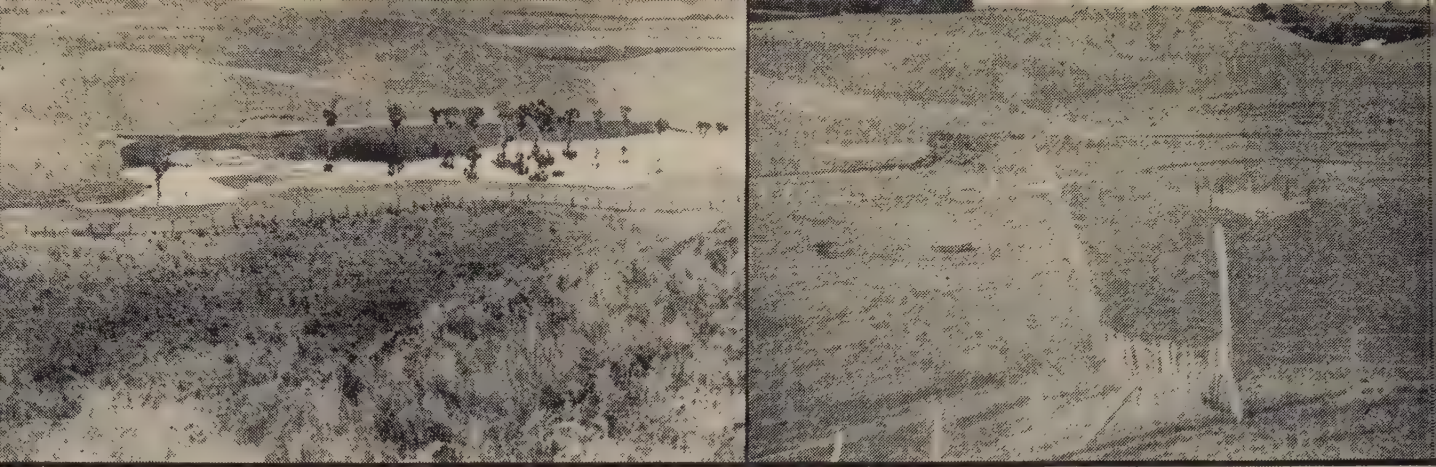
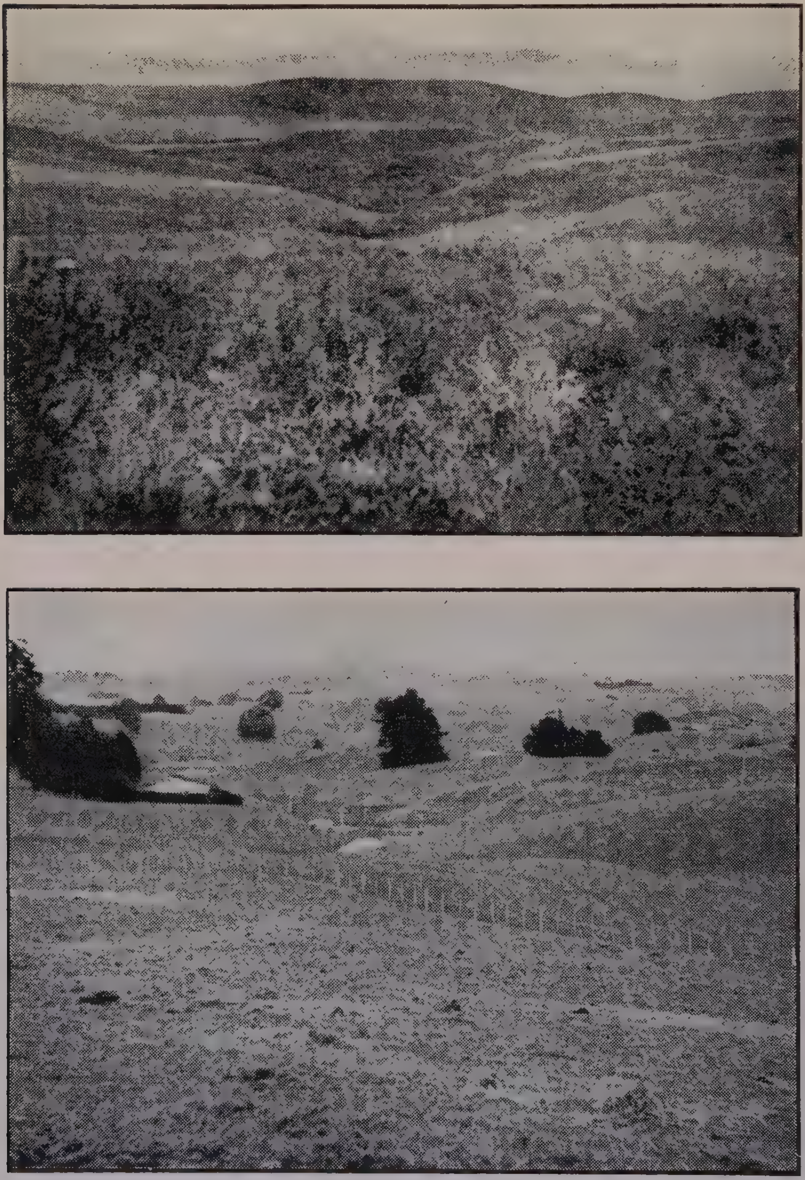
HEADING PHOTOGRAPH: An aerial view of Mr. S. G. Barnett's farm which comprises nearly all of one of the original subdivisions of the Mangapouri Block. Auster Airviews photo.



Contrasting views of portions of the Mangapouri Block. The illustrations at left above and at top below show parts of the Block about 50 years ago and the other illustrations show the same areas as they are now.



The Auckland Agricultural Company acquired several undeveloped estates in the Waikato, including Waitoa, Okoroire, Paeroa, Mangawhero (adjoining Matamata), and Mangapouri, near Tirau.

## In Hands of Bank of New Zealand

Nearly all the large land companies in the Waikato had borrowed heavily from the Bank of New Zealand. When prices were reasonably good or when there was hope for a rapid improvement the burden could be carried, but as the depression of the 1880s and early 1890s deepened the companies were unable to meet their liabilities and their enterprises fell back into the hands of the bank.

The bank itself was in serious difficulties and the Government had to come to its rescue in 1894.

In the reorganisation which followed a new body was formed, the Assets Realisation Board, the aim being to manage the estates prudently and then sell them off when circumstances were favourable.

John McCaw, a Scotsman who had come to New Zealand in 1877, was appointed manager for the bank in the Waikato in 1889 before many of the other properties had fallen into the bank's hands. He had been employed by the New Zealand and Australian Land Company for some time at Totara, near Oamaru, and after leaving the company's service he had managed estates in South Canterbury. He made his headquarters the Fencourt estate, but later they were at Matamata.

## Importance of Topdressing

McCaw is an important figure in the history of Waikato farming, for he was among the first to realise the importance of topdressing.

In the late 1890s about 1800 tons of fertiliser was being used a year on the properties he managed. Applied at the rate of about 2cwt. per acre, probably most of the fertiliser was used on turnips, but a description of the Matamata estate taken from Harris's "Diamond Jubilee of the Piako County" shows that McCaw was using fertiliser when he sowed down new grass as well.

The description of the Matamata estate and the methods followed on it would be true of all the places under McCaw's supervision:—

> About the year 1900, the Matamata estate consisted of 50,000 acres, inclusive of 10,000 of the Waharoa estate, part of which had been

leased to small farmers. . . The Matamata estate carried at the time 31,000 sheep, 2600 cattle and 184 horses. In grass were 22,000 acres; whilst there were 2000 acres in root crops, mostly swedes and soft turnips, and 500 acres in oats, which were to be threshed and made into chaff later.

A Hercules mower drawn by two horses was constantly in operation in most areas in order to keep down the scrub that covered the plain for miles. In this way, about 10 acres a day could be cleared. Then the ploughing was usually done by contract. Generally speaking, the estate found the horses and the feed, whilst the men received a daily wage according to the acreage ploughed—usually about 2s. an acre. By this method it cost about 5s. an acre to bring in the land; for it was planted with cow-grass and fed with artificial manures, which were put on in the first instance at the rate of 1½ cwt. to the acre.

It was very noticeable that the light soil of Matamata and, indeed, of the Upper Thames, responded marvellously to this method of treatment. Every cultivation showed an improvement in the return, further increased by the use of more fertiliser. This cow-grass was expected to last two or three years. Then the ground was planted in swedes or put into pasture, which was intended to last another six years when properly treated with artificial manures. So it was that this form of pasture technique gave a nine-year life to the grass when it was sown for the third time.

Part of Mr. Barnett's milking herd of 90 cows, most of which are registered Jerseys.

## Government Purchase

In 1896, just after McCaw took over the management of the properties, Mangawhero, which covered 5670 acres, was valued at £24,450; Mangapouri, of 2728 acres, was valued at £11,580. These values were probably still influenced by the misplaced optimism of the earlier decade, for when the Government bought them 10 years later £20,700 was paid for Mangawhero and £9300 for Mangapouri, even though there had been no reduction in the area.

## IMPROVED FARM ON MANGAPOURI BLOCK

The extent of the improvement that has taken place in the Matamata district during the last 45 years is shown in the accompanying illustrations from photographs taken of the same area before 1907 and recently. There follows a study of a farm that today comprises nearly all of one of the original subdivisions of the Mangapouri Block. Part of this property is used for fat lamb production, but all the rest of the original block is devoted to dairying. Average production is almost 200lb. of butterfat per acre.

Several of the first settlers on the Mangapouri Block still retain all or portion of their original allotments, but the owner of Section 11 of 383 acres held it for only a year before he died. During his occupancy he milked 100 cows. For 4 years after his death the holding was unoccupied, but was used for winter grazing by neighbours.

In 1911 Mr. S. G. Barnett, the present owner, took over Section 11 and an adjoining 123 acres. At that time all the sown pastures had partly reverted to fern, with cocksfoot and red clover the only grasses present. All the hill faces and 85 acres of swamp were in fern and scrub, and one subdivision fence divided the property into two paddocks.

Dairying was recommenced and in a few years 100 cows were being milked, the highest annual production being 30,000lb. of butterfat. Each year 80 acres were ploughed with two single-furrow ploughs—35 acres for swedes, 35 acres for pasture after the crop, and the balance for oats and peas for horses and pigs.

In December of each year 16lb. of seed per acre, consisting of 8lb. of perennial ryegrass, 6lb. of cocksfoot, 1lb. of timothy, and 1lb. of white clover, was drilled through every coulter, with a mixture of superphosphate and blood and bone, and this practice continues today, although the amount of seed has been increased.

Topdressing began in 1912 with basic slag, guano, and imported superphosphate, and in 1917 the use of a small amount of potash and lime was begun and continued for 20 years.

With the exception of a small, steep sideling all the farm has been ploughed twice.

## 313 Acres; 40 Paddocks

A portion of the original holding was sold for rehabilitation purposes and the area now farmed is 313 acres, divided into 40 paddocks by fences which were erected mainly during the first regrassing period.

Windbreaks and internal shelter belts of lawsoniana, gums, and pines were planted during the early years of occupation, and in all some 7000 trees were set out; 2000 pines planted in 1916-17 were recently milled to produce 260,000ft. of sawn timber, but in 1911 only two trees were growing on the property.

At present the 313 acres are being farmed as a dairy and fat lamb farm, and are carrying 125 dairy cows, 40 2-year-old heifers, 10 yearling bulls, 600 ewes, 180 wethers, 130 ewe hoggets, 200 wether hoggets, and 20 horses.

The farm is flat to easy undulating, varying from 300ft. to 500ft. above sea level. Two main soil types are found on the farm, Tirau sandy loam, derived from the Tirau ash shower, and Waitoa silt loam and clay loam on the drained

## The Mangapouri Block

THE Mangapouri Block as it was when thrown open for selection in 1907 after purchase by the Government from the Assets Realisation Board is described in the following extracts from the advertisement of the ballot:—

"The Mangapouri Settlement . . . is situated in Piako County [now Matamata County], within convenient distance from the Towns of Hamilton, Cambridge, Tauranga and Rotorua.

"It adjoins the Township of Tirau, and the Tirau and Taumangi Railway-stations, 134 miles and 137 miles from Auckland respectively, are within fifteen minutes' drive of the settlement. The City of Auckland can be reached in six hours by rail.

"The quality of the soil on the whole is a good light sandy loam, on shingle, sandstone, and rhyolite.

"The settlement is suitably subdivided into dairy farms, the land being adapted for this industry.

"The climate is bracing and the rainfall equable.

"The area offered for lease contains 2550 acres and 33 perches, which has been divided into ten dairy farms, varying in area from 163 acres 2 roods to 411 acres. The grasses at present on the various farms are of mixed English varieties, and, with the exception of the grass sown last spring, is from three to four years old, and all in good heart. White and green crops grow well on the settlement. The whole area is practically ploughable, and it should be noted that nearly all grassing has been done by plough. Watering facilities are generally good, but in some instances wells will have to be sunk; but water will probably be found at no great depth. Timber for fencing and building is procurable at reasonable rates from Mokai and Mamaku mills. There is a school, store, hotel, and post and telegraph office at Tirau, and intending selectors will find this the most convenient place to stay when viewing the settlement."

The sheep section of the farm, on which 600 ewes are farmed for fat lambs.

flats. Both these soil types are moderately fertile, but tend to dry out in summer.

## The Dairy Section

Although the farm is managed as one unit, 100 acres are reserved for dairying and on this 90 cows are milked, but the replacements are carried on the sheep section. The skimmed milk is used to rear 40 calves annually, the balance being used by 7 sows and their progeny. Three of the breeding sows at present on the property are from a sow that had 17 litters and averaged 14 piglets per litter, and this partly accounts for the high average of 10 piglets per litter from the 7 breeding sows now carried. Horse breeding, once a major project on this farm, is still carried on, but to a much less extent.

Thirty acres a year are closed for autumn-saved pasture and with the use of the electric fence this area is sufficient to provide ample grass until spring growth begins, but is supplemented with silage and hay. Each year 80 acres are made into silage and 30 acres into hay, but as the owner has a pick-up baler, all toppings are baled to bring the total to 3000 bales a year. A small area of swedes is grown annually and the land is returned to permanent pasture in the spring by drilling in 30lb. of a mixture of perennial ryegrass, short-rotation ryegrass, cocksfoot, timothy, and red and white clover. Three hundredweight per acre of phosphate was the usual annual topdressing, but over the last 3 years this has been changed to 2cwt. of superphosphate and 1cwt. of muriate of potash per acre, as both soil types on the farm require potash.

## The Sheep Section

On the sheep section 600 ewes are farmed for fat lambs, and any surplus feed is either made into hay or utilised by the purchase of store lambs. Shearing is done by contract shearers in the owner's woolshed, and in recent years the ewes have averaged 10lb. of wool per clip.

The farm is efficiently watered with 300-gallon water troughs in every paddock, the supply coming from a spring in the middle of the farm, and being elevated by a ram with a capacity of 15,000 gallons per day. Supplementary reservoirs holding 10,000 gallons insure against a pumping breakdown.

Adequate shelter is provided by lawsoniana and barberry hedges planted on about half of the subdivision fences.

## Labour and Equipment

The owner, his son, and a married employee housed on the farm do all the routine work, including the preparation of pedigree Jersey yearling bulls for sale, but casual labour is employed for shearing. With a full range of cultivating implements, 2 tractors, a self-tying hay baler, tedder, and sweeps, seasonal work is kept up to date.

## Claim Substantiated

With the exception of part of Mr. Barnett's farm, the whole of the original Mangapouri Block is entirely devoted to dairying, and though production varies from farm to farm, the average production is almost 200lb. of butterfat per acre. This amply substantiates the claim made in 1907 that the land is suitable for dairy farming.

☆

# Pedigree Sow Records

Contributed by the Animal Industry Division

In the period January to June 1953 the following breeders had litters recorded as shown:—

| Owner's name and address | Herd book number | | Number of pigs | | Litter weight | | Litter grade* |
|---|---|---|---|---|---|---|---|
| | Sow | Sire | Born | Weaned | 3 weeks lb. | 8 weeks lb. | |
| **Tamworth** | | | | | | | |
| Smith, F. E., Orongo, R.D. Turua, Hauraki Plains | 17431 | 17637 | 10 | 10 | 114 | 375 | 2 |
| Jacobs, W. H., Matai Ahoura P.O., Westland | 17761 | 16860 | 10 | 10 | 117 | 426 | 2 |
| Jacobs, W. H., Matai Ahoura P.O., Westland | 17762 | 16860 | 9 | 8 | 90 | 307 | 3 |
| **Large White** | | | | | | | |
| Secretary, Levin Pig Club, R.D. Levin | 10723 | 10721 | 9 | 9 | 90 | 238 | 5 |
| Knight, M. H., The Avenue, Levin | 10264 | 7955 | 18 | 9 | 108 | 408 | 2 |
| Knight, M. H., The Avenue, Levin | 9237 | 7955 | 17 | 12 | 129 | 481 | 1 |
| I'Anson, F., and Farrelly, B., Sect. 3 R.D., Whakatane | 10397 | 9080 | 11 | 11 | 127 | 426 | 1 |
| Wood, A. E., Sect. 3 R.D., Whakatane | 10178 | 10693 | 10 | 8 | 124 | 403 | 1 |
| Harper, R. J., Waiterimu R.D., Ohinewai | 10341 | 9874 | 11 | 7 | 53 | 266 | — |
| Harper, R. J., Waiterimu R.D., Ohinewai | 9903 | 9874 | 12 | 8 | 74 | 273 | 5 |

**Minimum Litter Weight for Grades**

| Grade* | 3 weeks (lb.) | 8 weeks (lb.) |
|---|---|---|
| 1 | 120 | 360 |
| 2 | 100 | 300 |
| 3 | 90 | 270 |
| 4 | 80 | 240 |
| 5 | 70 | 210 |

**Breed Averages for the Period under Review**

| Breed | Number of litters recorded | Number of pigs | | Litter weights | | Average weight per pig | |
|---|---|---|---|---|---|---|---|
| | | Born | Weaned | 3 weeks lb. | 8 weeks lb. | 3 weeks lb. | 8 weeks lb. |
| Tamworth | 3 | 9.6 | 9.3 | 107 | 369.3 | 11.5 | 39.7 |
| Large White | 7 | 12.5 | 9.1 | 100.7 | 356.4 | 11.0 | 40.0 |

* A No. 3 grade is classed as good, No. 2 excellent, and No. 1 as special.

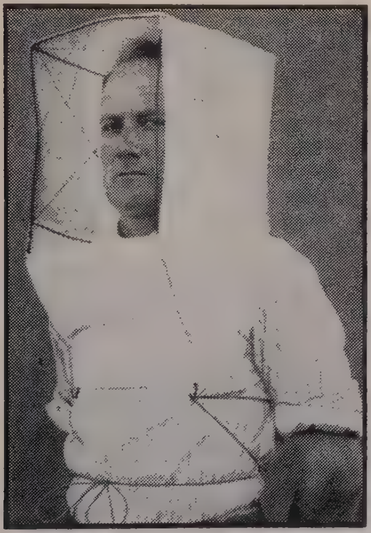
# Improved Bee Veils

DESPITE the advancement in the breeding of docile strains of bees, the veil is a very essential part of a beekeeper's equipment. The improved types here described by I. W. Forster, Apiary Instructor, Department of Agriculture, Oamaru, are designed to give adequate protection without undue discomfort.

ONE of the trials of beekeeping is the necessity of being fully clothed and of carrying the weight of a bee veil on one's head. As the hardest apiary work is usually performed during the hottest weather, the discomfort can be considerable. The fact that bee veil designs are so many and varied indicates the importance that beekeepers attach to the efficiency of this equipment.

## Cloth Veils

Veils made of cotton net are light to wear and convenient to carry. Black net is easier to see through than white net, but if a white veil is desired for the sake of coolness, a panel of black net can easily be inserted to act as a visor. Bees see white very readily, and do not collide with a white veil as they do with a black one. On the other hand a white veil must be kept in very good repair, as even the smallest hole presents a conspicuous black void for which bees will quickly make. Bees find their way into holes in a black veil only by crawling on to them.



One drawback of net veils is that they tend to come into contact with the face or neck and thus expose the wearer to the danger of being stung. Also a veil blowing in the wind is most trying to see through.

## Wire Gauze Veils

Wire gauze veils have the advantage of being indestructible and are sufficiently rigid not to billow in against the face. If painted black, wire gauze gives good visibility.

The average wire gauze veil suspended from a hat imposes a fair weight on the wearer's neck and makes the turning of the head a rather ponderous movement.

## Shoulder Veils

The main feature of a shoulder veil is that the weight is carried on the wearer's shoulders, and the head is free.

### Square Veil

The square shoulder veil illustrated at left is designed for minimum weight and allows cloth net to be used to good advantage.

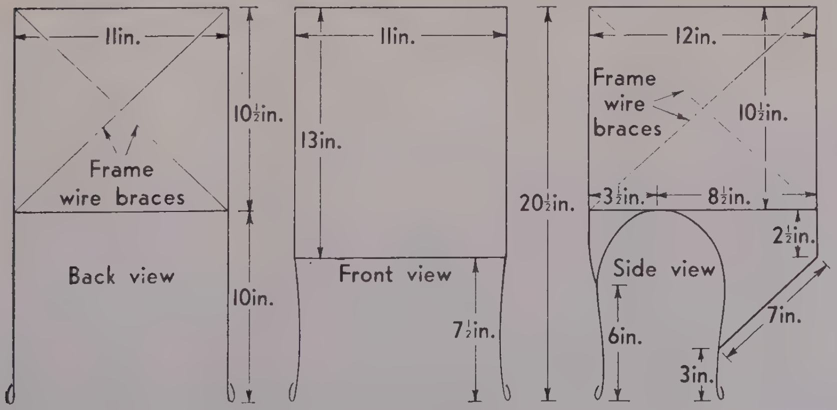
The frame is of 12 gauge wire cross-braced at top, sides, and back with 26 gauge wire. To ensure a rigid structure the wires over-lap at the joints for 2in. and are soldered together.

The sides and back are covered with white net and the front with black net. The top and skirt are of calico. The skirt is shaped at the bottom and sown to the wire yoke with a ½in. hem overlapping to come between the wire and the wearer's shoulder. This effectively blocks any space that may occur between the wire and the shoulder.

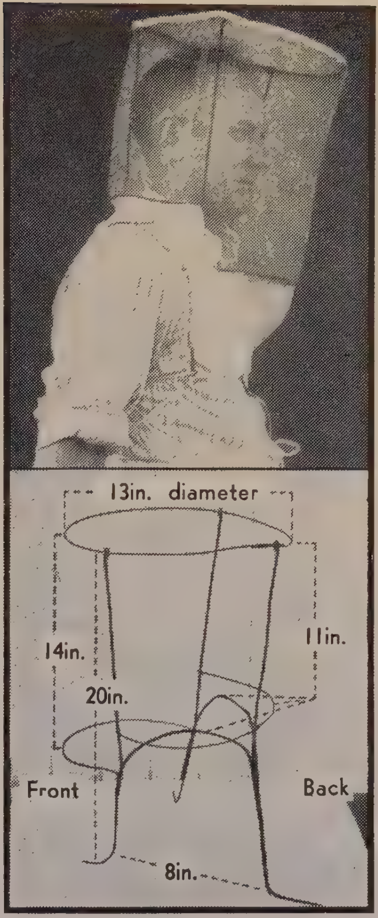
The tie strings attached to loops at the lower ends of the back yoke wires are brought forward over the hooks at the lower end of each front yoke wire and then carried back and around the waist.

### Round Veil

The round type of shoulder veil is of much more robust construction. The frame is of 8 gauge wire, soldered at the joints. Owing to the greater rigidity of the wire gauze used for this veil only three uprights are required.



Upper left—Square shoulder veil. Lower—Diagram of frame of square veil.



Upper—The round, heavy veil is recommended for all-round work in commercial apiaries. Lower—Frame of the round veil.

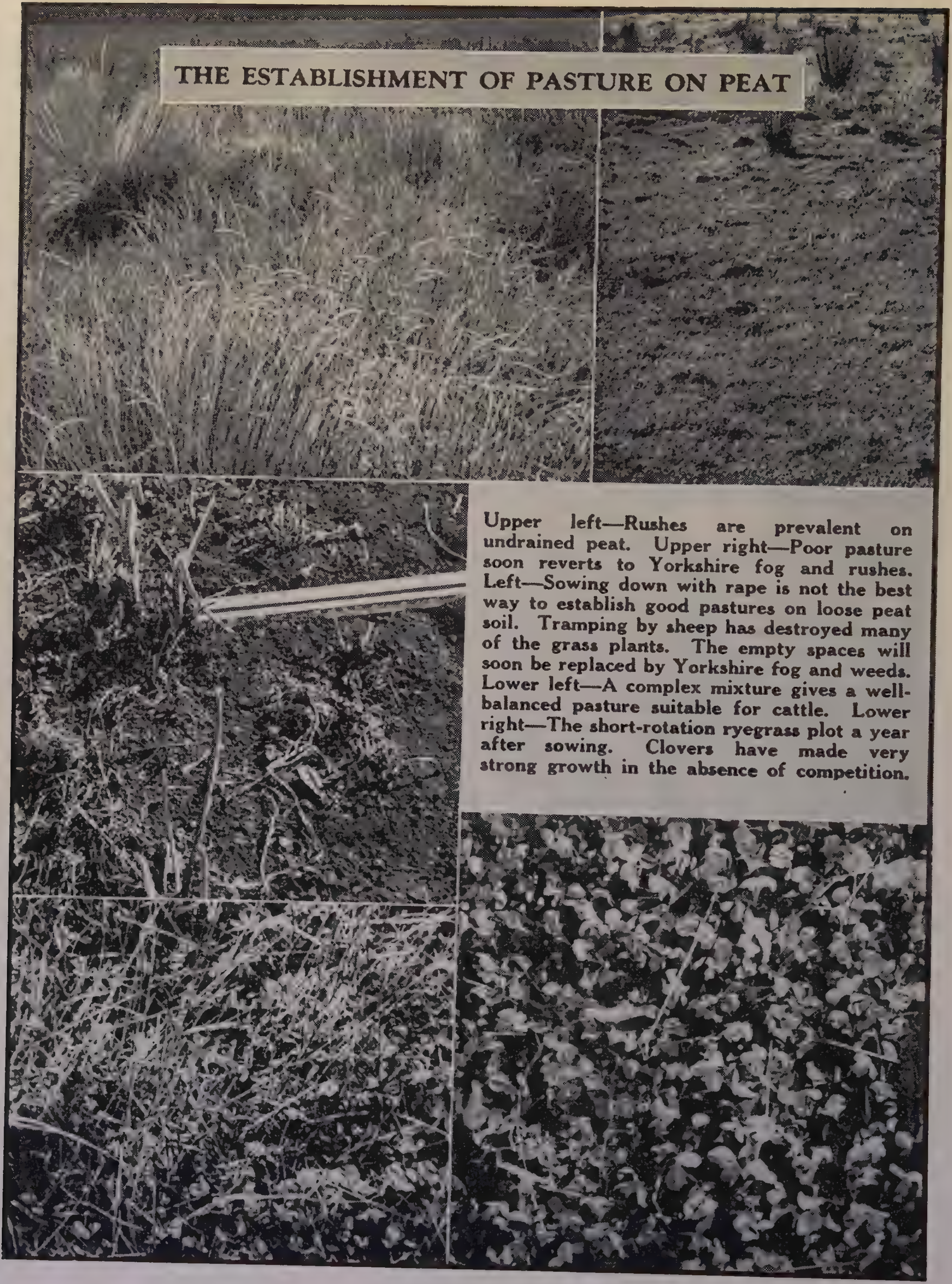
The back legs of the yoke wires join the lower end of the rear upright and continue down the middle of the wearer's back for some 7in. From the junction point the yoke wires run across the shoulders at an angle and about 7in. down the chest near the armpits. It is necessary to spread the front legs of the yoke thus so that they will not foul objects lifted against the front of the chest.

The veil has a calico top and skirt. The wire gauze comes down to chest height in the front and to shoulder height at the sides and back. The front panel is painted black to give better vision.

The tie strings attached to the centre lower back of the skirt are brought forward under the arms through loops on the front corners and then carried back round the waist.

Both types of shoulder veil will give satisfactory service, but the round, heavy one is recommended for all-round work in commercial apiaries.

# THE ESTABLISHMENT OF PASTURE ON PEAT



Upper left—Rushes are prevalent on undrained peat. Upper right—Poor pasture soon reverts to Yorkshire fog and rushes. Left—Sowing down with rape is not the best way to establish good pastures on loose peat soil. Tramping by sheep has destroyed many of the grass plants. The empty spaces will soon be replaced by Yorkshire fog and weeds. Lower left—A complex mixture gives a well-balanced pasture suitable for cattle. Lower right—The short-rotation ryegrass plot a year after sowing. Clovers have made very strong growth in the absence of competition.

# Establishment of Pasture on Peat in Ashburton County

By R. INCH, Fields Instructor, Department of Agriculture, Ashburton

**THAT good pastures can be established on the peaty soils of Ashburton County, which cover about 8000 acres, has been shown in trials by the Department of Agriculture. A thick, healthy sward must be established as soon as possible to counter weed growth, and the ability of perennial ryegrass to grow quickly and form a good cover makes its inclusion in the seeds mixture essential. Recommendations for the preparation of the seed-bed and the seeds mixture are given in the following review of the results of the Department's trials.**

THE peaty soils in Ashburton County vary from 12 to 20in. of dark brown, fibrous, loamy peat to 6 to 8in. of peaty silt loam and peaty clay loam. About 1600 acres of the deepest and most fibrous peat lie between Eiffelton and Lynnford, near the Hinds River. The area is low lying and until recent years has been very hard to drain.

In its undrained state strong clumps of rushes are prevalent, the herbage between the rushes being dominantly Yorkshire fog (*Holcus lanatus*) and old man twitch (*Agropyron repens*). Attempts have been made at various times to establish pastures. The practice of using poor types of perennial ryegrass, sown down with other crops, gave this grass a bad name and of late years it has been replaced mostly by Italian ryegrass. The short life of Italian ryegrass combined with waterlogging of the soil was not conducive to long life of the sward, which quickly reverted to a thick mat of Yorkshire fog. This was a very expensive and discouraging process. Since the South Canterbury Catchment Board provided main drains through this area most of the waterlogged soils can be drained.

## Pasture Trial

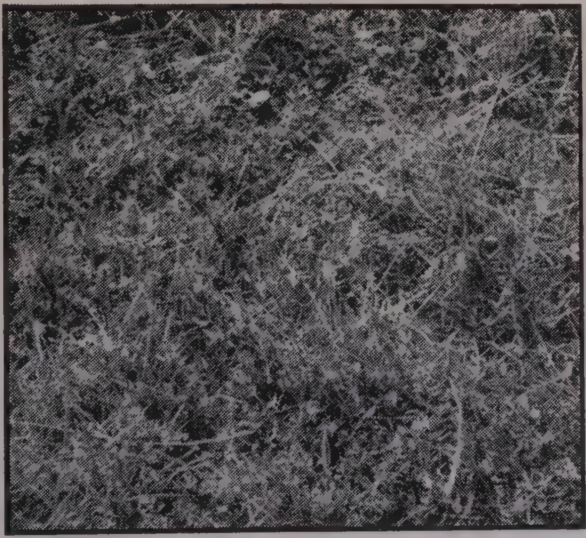
Trials to find out what grasses, clovers, and fertilisers would best suit this class of land were laid down by the Department of Agriculture in 1949. A suitable area of land freshly ploughed out of rushes and Yorkshire fog could not be found, so it was arranged to use part of a paddock which was slightly drier and where the fibrous texture of the peat had been partially broken up by cultivation over a number of years. Twelve plots were sown, each containing a different mixture of grasses and clovers. The remainder of the field was laid down in short-rotation ryegrass, oats, and white clover. Italian ryegrass had been harvested from the area in the summer of 1947, after which it was grazed and then ploughed in November 1948 and fallowed until sown on 10 March 1949.

The plots were sown with mixtures containing various combinations and seeding rates of the following grasses and clovers: Perennial ryegrass, short-rotation ryegrass, cocksfoot, timothy, *Phalaris tuberosa*, crested dogstail, alsike, white clover, Montgomery red clover, cowgrass, and *Lotus major*.

Superphosphate at the rate of 1cwt. per acre was sown with the seed, and one half of each plot received a dressing of carbonate of lime at the rate of 2 tons per acre.

The autumn and early spring of 1949 were fairly dry. Germination was good, but little growth had been made at the beginning of the first winter. The plots containing most perennial ryegrass gave the best cover at this stage, those with the general mixtures also being quite good. Timothy, cocksfoot, and phalaris plants were small and where they had been sown without ryegrass they produced very open swards. In the late spring these grasses were still small, but the clovers made excellent progress in the plots where there was little competition, growing much stronger than those competing with ryegrass. At the same time the ryegrass-dominant plots were producing the most feed.

Throughout the first summer the clovers, especially the white clover, made excellent growth, with limed plots much superior to those not limed. Alsike grew well at this stage, but Montgomery red clover did not show to advantage until the autumn of 1951 after the area had been closed up for some time. *Lotus major* did not become established. Perennial ryegrass grew very well, but short-rotation ryegrass in the rest of the paddock and in the trial plots had practically disappeared by the autumn of 1951.



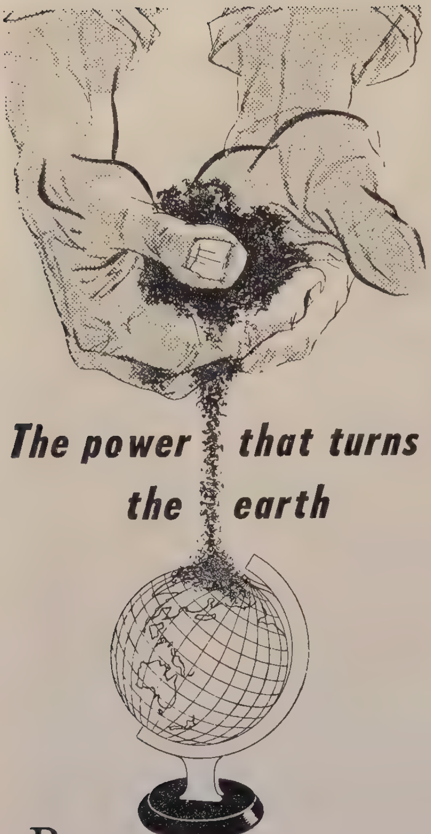
A simple mixture of grass and clover makes a good sheep-grazing sward.

Good-quality perennial ryegrass is still the best all-round grass on the trial, especially for sheep feed. In a simple mixture with white clover or in the more complex mixtures it established early, made a good cover, and has provided a large amount of feed. Short-rotation ryegrass on the other hand did not last more than 10 months, giving no more feed than perennial in that time. Timothy was disappointing. Where sown with clovers only it grew very slowly and could not compete with Yorkshire fog. Cocksfoot made better progress than timothy, but was slow to establish where sown on its own. It appears to be a very useful grass in mixtures. *Phalaris tuberosa* has been a little better than cocksfoot throughout the trial. It has made better progress on peat than in trials on other soil types in Mid-Canterbury. Like timothy and cocksfoot, when sown without ryegrass, it produced an open sward, favouring the ingress of Yorkshire fog and weeds. Phalaris made a useful addition to the growth of the sward when included in grass-clover mixtures. Although crested dogstail has at no time been dominant, it was useful in helping to fill the bare spaces and provide a better ground cover.

White clover was the best of the legumes. Alsike did not show up well until the second spring. Montgomery red clover was also slow to establish itself and did not provide much bulk until the second summer. Cowgrass was no better than Montgomery red clover at any time.

There has been a good response to lime on this trial. Clovers have grown better, resulting in the grasses being more palatable to stock. There is still a good balance of clovers and grasses on the limed areas.

The aim must be to establish a thick, healthy sward as soon as possible, to discourage weed growth, especially lady's thumb or redshank (*Polygonum persicaria*) and Yorkshire fog. For this purpose a little extra care in preparing a good, firm seed-bed after germinating and killing as many as possible of the weed seeds in the topsoil is well worth while. Perennial ryegrass must form the basis of all seeds mixtures. Because it grows quickly and forms a good cover it is the premier grass for these conditions. Clovers are essential to maintain the nitrogen supply to the grasses as well as giving a better balanced feed. A good balance between grasses and clovers should be sought, and the application of 2 tons of carbonate of lime per acre before sowing is essential. Phalaris and cocksfoot are suitable for including in a mixture for cattle grazing, as they spread the season of growth and may prolong the life of the pasture. Under close sheep grazing they do not establish quickly enough and are suppressed by selective grazing.



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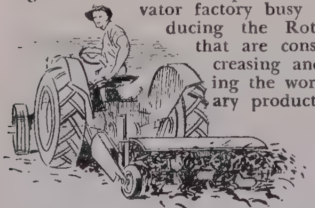

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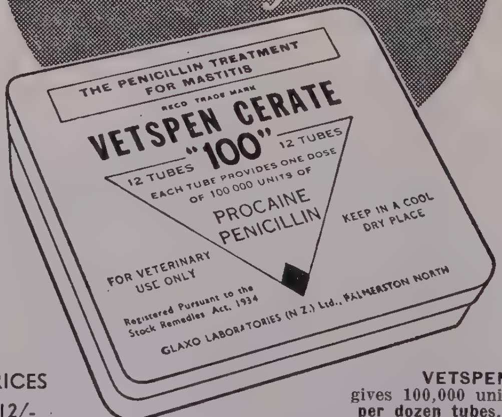
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# Outdoor Tomatoes in the Home Garden

By S. O. GILLARD, Horticultural Instructor,
Department of Agriculture, Auckland

THE cultivated edible tomato (*Lycopersicum esculentum*) is a native of South America, where it was grown as an ornamental as long as 400 years ago. It is a member of the family solanaceae, which includes a number of poisonous species. Tomatoes have been used commonly only since the end of the 19th century, and for many years were the subject of controversy. Their close relationship to inedible species, together with their distinctive and somewhat acid flavour, led many people to believe that tomatoes were poisonous. Since this prejudice has been overcome the popularity of the vegetable has increased steadily until it has become universally popular. Tomatoes are now one of the most widely used vegetables or fruits for canning, juice, sauces, soups, chutney, and even jam. Their properties are now considered beneficial to health, not injurious.

A profitable crop. [*Sparrow*

TOMATOES flourish, in a warm climate with plenty of sunshine. Cold, cloudy weather or prolonged periods of relatively low temperatures retard normal development and reduce fruiting. Adequate moisture throughout a frost-free growing period of 6 to 7 months is necessary for the production of high yields of good-quality fruit.

Tomatoes can be grown on a wide variety of soils, but the ideal soil is a deep loam overlying a well-drained subsoil. Light, sandy soils produce fruit a little earlier than heavier types, but tend to dry out quickly during dry spells.

The risk of building up soil diseases peculiar to any one type of crop is greatly reduced by crop rotation, which also permits the best use to be made of available soil fertility, as different crops use different proportions of the various plant foods. In the home garden cropping is usually intensive, crops following one another closely. Related crops such as tomatoes and potatoes should not be planted in the same area too frequently, nor should they follow one another. Tomatoes should follow a crop of cabbages, cauliflowers, or a root crop such as carrots, parsnips, etc., for best results.

## Varieties

There are many varieties of tomatoes of both tall and dwarf kinds. Tall varieties that produce smooth, round fruit are generally favoured for table use, but the main dwarf varieties, which can be produced more cheaply and come into production earlier than the tall varieties, are also popular.

Among the most popular tall varieties are Potentate, Carter's Sunrise, Moneymaker, Supreme, Stoners Prolific, and Abundance. Beefsteak can be recommended if very large fruit is desired. A good yellow-skinned variety is Golden Nugget.

Of the dwarf varieties Adelaide Dwarf, Early Chatham, and Stoners Dwarf Gem are the most popular. Adelaide Dwarf produces large, flattish, crinkled fruit and the other two have smaller, round, smooth fruit.

### Novelties

The fruits of many uncommon varieties are edible and have a flavour similar to that of better known varieties. Plum shaped (red or yellow skin), pear shaped (red or yellow skin), cherry (red or yellow skin), San Marzano (red skin and square-sided fruit), and peach, which resembles a peach in shape and skin colour, are examples of less commonly grown but interesting types. They vary in flavour and degree of acidity and are not considered equal to standard varieties for commercial purposes.

## Seed

Good seed is essential if good plants are to be produced. Growers may save their own seed by selecting the best fruits from carefully chosen, vigorous plants carrying heavy, disease-free crops of typical shape. When the plants from which it is intended to save seed have been selected, fruit from the first two trusses may be harvested and used. The remaining fruit should be left to ripen fully on the plants for final selection of the choicest specimens.

### Extraction of Seed

As several serious diseases of tomatoes are commonly carried with the seed, seed extraction should be done by the following method, which will eliminate infection:—

The fruit is weighed and the pulp squeezed into a wooden container. Commercial hydrochloric acid is added and stirred into the pulp with a length of wood, 1 fl. oz. of acid being allowed for each 5lb. of fruit. Occasional stirrings are given during the next 3 hours. The seed may then be placed in a fine sieve or muslin bag, washed free of all pulp under running water, and set out to dry in the sun. Acid extraction is fast, and not only eliminates seed-borne diseases, but gives bright seed with high germination.

## Seed Sowing

If it is desired to raise plants—most home gardeners prefer to buy them—seed should be sown about 7 to 8 weeks before it is intended to set the plants out in the garden.

Plants may be raised in a small cool frame (see the illustration on page 139 and the article "Construction and Use of Frames and Lights in the Home Garden", which appeared in last month's "Journal") or the seed can be sown in a shallow wooden box with several holes in the bottom for drainage and filled with a mixture of good soil. Too rich a soil is not advisable, but the soil should be sufficiently open in texture to induce rapid root growth and yet be sufficiently retentive of moisture to avoid rapid drying out. In general, any average topsoil, preferably from a pasture field or from one that has not grown tomatoes, is satisfactory. To every 5 parts of soil should be added 1 part of rotted stable manure or compost and a sprinkling of carbonate of lime and the whole mixed thoroughly.

To kill any harmful fungi which may be carried in the soil it is desirable to treat the box of soil with a 1 : 50 formalin solution applied at 5 pints per cubic foot of soil. After treatment soil should be covered with a sack saturated in the solution. Forty-eight hours later the box can be

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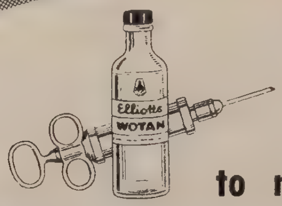

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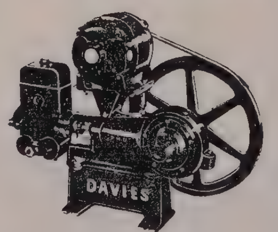

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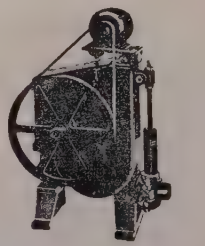

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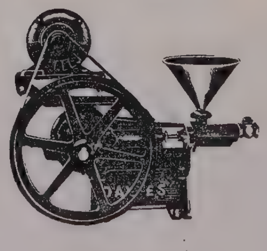

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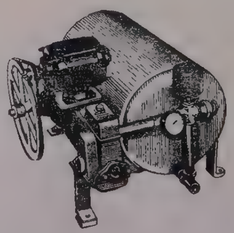

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uncovered and the soil stirred. It will be unsafe to sow or plant treated soil until the smell of formalin has disappeared from the soil, which usually takes from 5 to 7 days.

Soil when put into seed boxes should be firmed evenly, particular attention being paid to the corners, so that finally the soil is about ½in. below the tops of boxes. Seed should be scattered over the soil not too thickly and covered with a thin layer of finely sifted sandy soil. This should be watered with a fine rose. The box should then be covered with glass with a sheet of paper on top and placed in a sunny, sheltered situation.

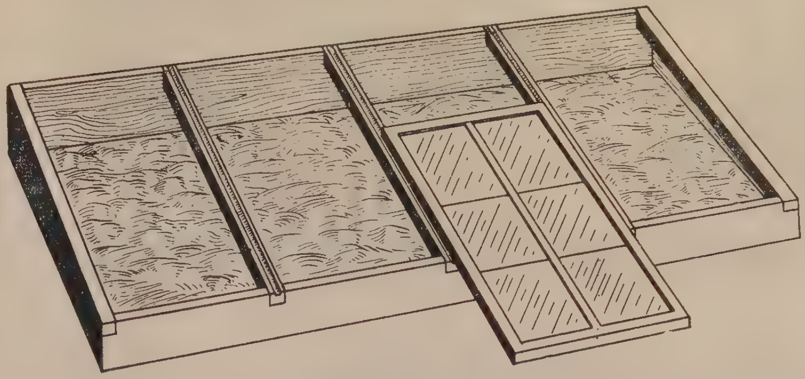
Seedlings will appear in from 7 to 10 days, when the covering should be removed.

### Pricking out

As soon as the true leaves appear the seedlings should be pricked out into seed boxes similar to the box used for the sowing of seed. A suitable soil for pricking the plants into is one similar to that described for seed boxes, except that a sprinkling of superphosphate should be added. This soil should also be treated with formalin and the plants should not be set until all trace of the formalin has gone.

Seedlings should be planted in the soil up to the seed leaves and the soil firmed about their roots, but not tightly against the stems. Plants, which should be about 2in. apart, must be handled carefully by the leaves, as the stems are very easily injured and should not be handled between finger and thumb.

If the weather is bright, the plants should be shaded until the following day. When they have straightened up they should be watered through a fine rose. After the first watering plants should be given no more than is sufficient to keep them growing. They should be placed in a well-sheltered, sunny position. In about 5 or 6 weeks the plants should be 6 to 8in. high and ready for transplanting to their permanent positions outside. Plants when removed from boxes will carry soil with them. Even at this stage they must be handled with great care to avoid injury.



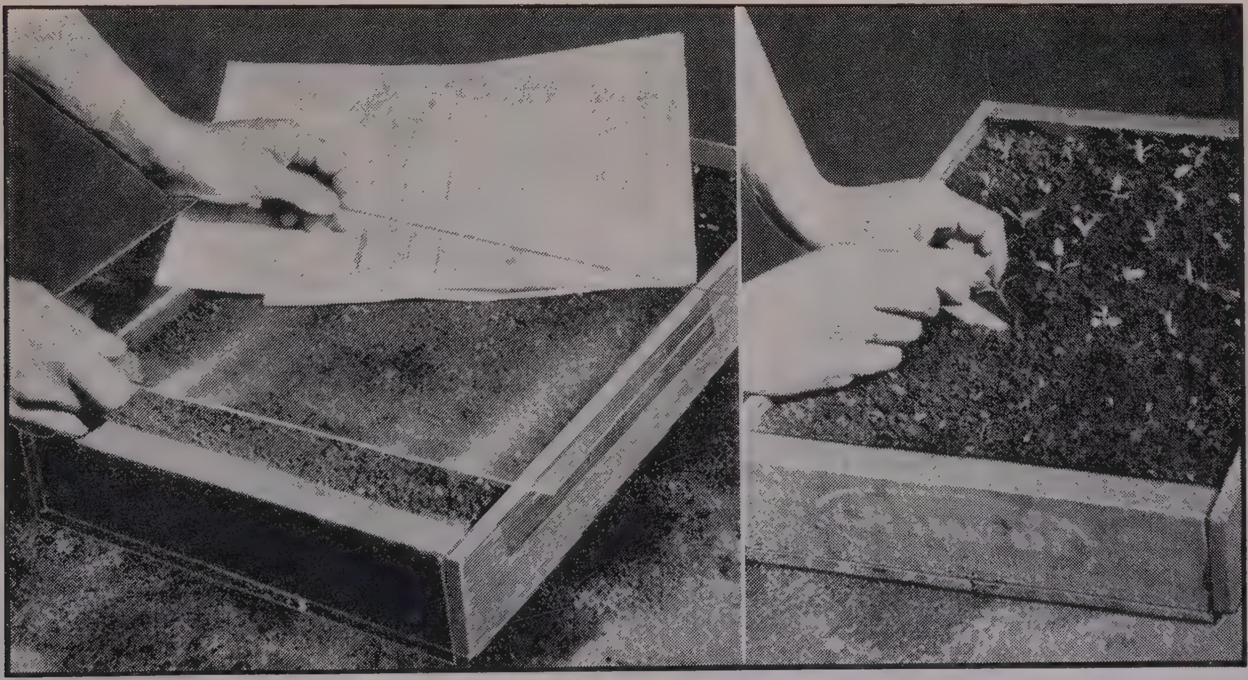
Cool frame suitable for the raising of tomato plants. That shown is a 4-sash frame, but the design could be modified to accommodate one sash or more. Ventilation may be provided by sliding sashes backward or forward. The frame is 6in. high in front and 9in. high at the back. Each of the cross-pieces that hold the sashes has a shallow groove down the centre of its upper surface to carry off water that may enter between the sashes.

## Bought Plants

Bought plants should be stocky and well grown and about 6in. high; spindly, long-stemmed plants which have not been properly hardened off should not be accepted. Hardening off is the process of subjecting the plants gradually to conditions similar to those they will have when planted out. If bought plants appear to be very tender, it is advisable to harden them off at home before planting them out in the open.

## Soil Preparation

A well-drained, warm, sheltered position is desirable and the soil should be dug deeply. A good fertile soil is essential for high production and stable manure, compost, or a green crop can be used to improve the soil. Where a green crop has been grown it should be dug in 4 to 6 weeks before tomatoes are planted to allow time for the green material to decompose.



[*Sparrow*

Raising plants. Left—A piece of glass should be placed over the seed box to hasten germination and to hold moisture. A sheet of paper can be placed on the glass to reduce the intensity of sunlight, but it must be removed as soon as the seedlings appear. Right—Pricking out seedlings.

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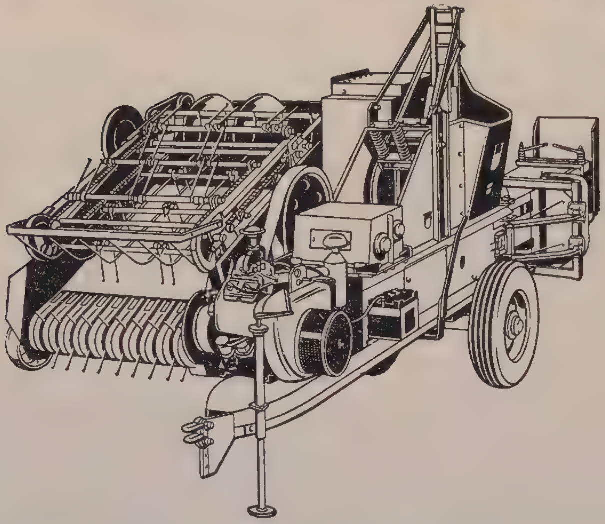

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Full details of scheme are presented in a pamphlet obtainable from District offices, Lands and Survey and Internal Affairs Depts., N.Z. Forest Service, City Councils, County Councils, Catchment Boards, Acclimatisation Societies.

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About a week before planting, the land should be worked down to a good tilth, that is, levelled and any large lumps broken up.

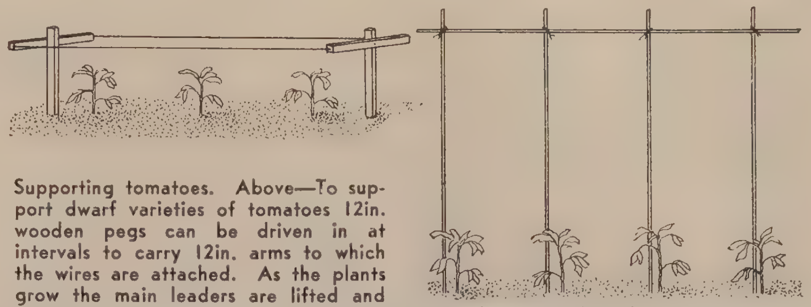
### Liming

Lime plays an important part in the growing of most vegetable crops, and tomatoes especially will not tolerate very acid soils. Most garden soils require annual dressings of carbonate of lime at ¼lb. a square yard, and, if the garden has not received any for several years, this quantity should be doubled.

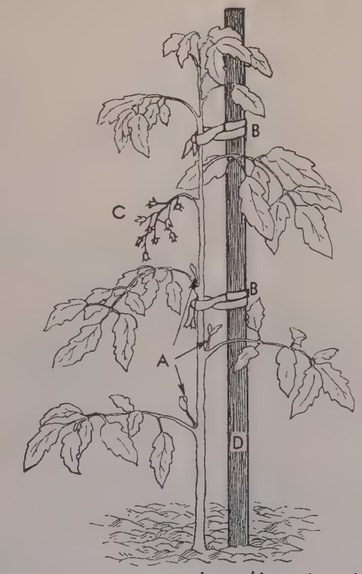
### Fertilisers

**Base dressing:** Tomato plants respond well to liberal manuring. The type of soil, kind of crop previously grown in the land, and the climate all determine the composition and quantity of fertilisers to be used. A good general base dressing is ¼lb. per plant of a mixture containing 10lb. of blood and bone, 10lb. of "super. compound", and 5lb. of sulphate of potash. This mixture is best worked into the plant rows several days before planting to avoid any possible damage through burning of the plant roots by the fertiliser. Plants should never be set with their roots in direct contact with the fertiliser.

**Side dressing:** Additional quantities of fertilisers, especially of those classed as nitrogenous, are required later to swell the growing fruit. If this nitrogen was made available in the base dressing, most of it would be assimilated by the young plants and this would lead to lush, soft growth, which predisposes plants to attacks by disease, and little nitrogen would be left for the later needs of the crop. A side dressing should be given at the fruiting stage. It should consist of equal parts of dried blood and "super. compound" or of a good proprietary mixture containing a high percentage of nitrogen. This dressing should be at the rate of 2oz. per plant, sown along the plant rows. Care should be taken not to allow the fertiliser to touch the leaves or stems. The fertiliser should be lightly worked into the soil.



Supporting tomatoes. Above—To support dwarf varieties of tomatoes 12in. wooden pegs can be driven in at intervals to carry 12in. arms to which the wires are attached. As the plants grow the main leaders are lifted and tied to the wires, over which they are allowed to hang. Right—The simplest method of training tall tomatoes, and that usually adopted by home gardeners, is to stake each plant separately. Planting is on the single-row system and as growth is made plants are supported by successive ties, six usually being sufficient.



Pruning, tying, and staking tomato plants. A—Points where side shoots from leaf axils are rubbed out before they grow more than about 2in. long. These side shoots should be removed up to the seventh flower truss only. B—Soft twine or cloth strips used to hold main stem erect. A double wrap is first made around the stake to prevent the binding from slipping and a single loose wrapping is then passed round the stem and tied. Tying should be repeated every foot or so as the plant grows. C—Fruit spur. D—Stake 1½in. in diameter and 6ft. long driven about 12in. into the soil and about 2in. from the stem.

## Planting

Tomatoes are frost tender and cannot be safely planted in the open until all danger of frost is past. Although they may be planted out in October in most northern districts, it will not be safe, except in a few favoured areas, to begin planting outside in southern districts until the middle of November.

After the final soil preparation plants should be set out along the manured bands. Dwarf varieties require more space than tall varieties and should be spaced 2ft. 6in. apart in rows 3ft. apart. Tall varieties require spacings of 18in. between plants and 3ft. between rows. The soil should be firmed around the plant roots as they are set out, and if conditions are at all dry, some water should be given.

### Supports

Although it is not usual to support dwarf varieties, they will produce better quality fruits if they are prevented from touching the soil (see diagram above).

For tall varieties wooden stakes 6ft. long should be set in position before planting, as supports put in after planting are liable to damage the plant roots. Each plant should be set close to the stake and in the line of the stake row, as a plant in this position can be tied to the support easily later and it is less liable to be damaged during cultivation. Material that will not cut into the stem of the plant, such as binder twine, raffia, or flax, should be used for tying, and the loop of the tie should be sufficiently large to allow the stem to grow. Ties should be made at 10in. to 12in. intervals as the plant develops.

## General Culture

Pruning is not generally necessary for dwarf varieties, but it is essential for the best development of tall varieties. As the plants grow side shoots developing in the axils of the leaves should be removed by rubbing them out before they grow too large. If left to grow more than about 2in. long, they are more difficult to remove without leaving large scars, and the unnecessary growth wastes the energy of the plant. Some growers always remove the lower leaves from plants when they have attained a height of several feet. This practice is not advised, except when leaves are dead or touching the soil. The leaves are the food-converting organs and the more healthy leaves a plant carries the greater is the amount of plant food it can assimilate. Foliage also shades the fruit against sunburn.

### Shallow Cultivation

Fairly frequent cultivation is necessary to suppress weeds and to keep the surface of the soil loose to aerate it. As tomatoes are fairly shallow rooting and any damage to the roots, especially at the fruiting stage, reduces their growth and consequently their yield, all cultivation should be shallow.

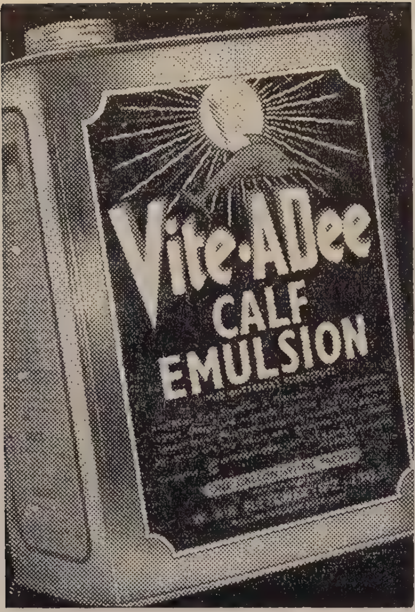
The plants should not be allowed to be checked through lack of moisture during long spells of dry weather. Water should be applied as periodical thorough soakings of the soil as required rather than as more frequent, light waterings. Small amounts of water that wet only the surface soil may do harm when conditions are very dry, as they encourage the plant roots to grow nearer the surface, where evaporation of moisture is rapid.

## Harvesting

The fruit should be harvested directly it has coloured. Leaving fruit on the plant too long after it is ripe not only exposes it to damage by birds, but tends to retard further plant development. It should be washed or carefully wiped before use to remove spray residues. The harvesting period for dwarf varieties is about 8 to 10 weeks; tall varieties under favourable conditions will give a continuous supply of tomatoes for 16 weeks or more.

## Diseases and Insect Pests

Unfortunately the tomato plant is susceptible to attack by many insect pests and diseases, and in the warmer, high-rainfall districts the fight against disease infection must be unceasing. So that growers may recognise the



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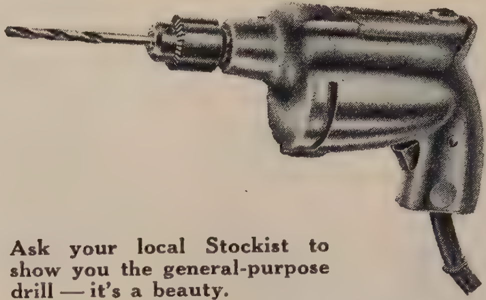

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more common diseases and insect pests a brief description of them follows:—

### Fungous Diseases

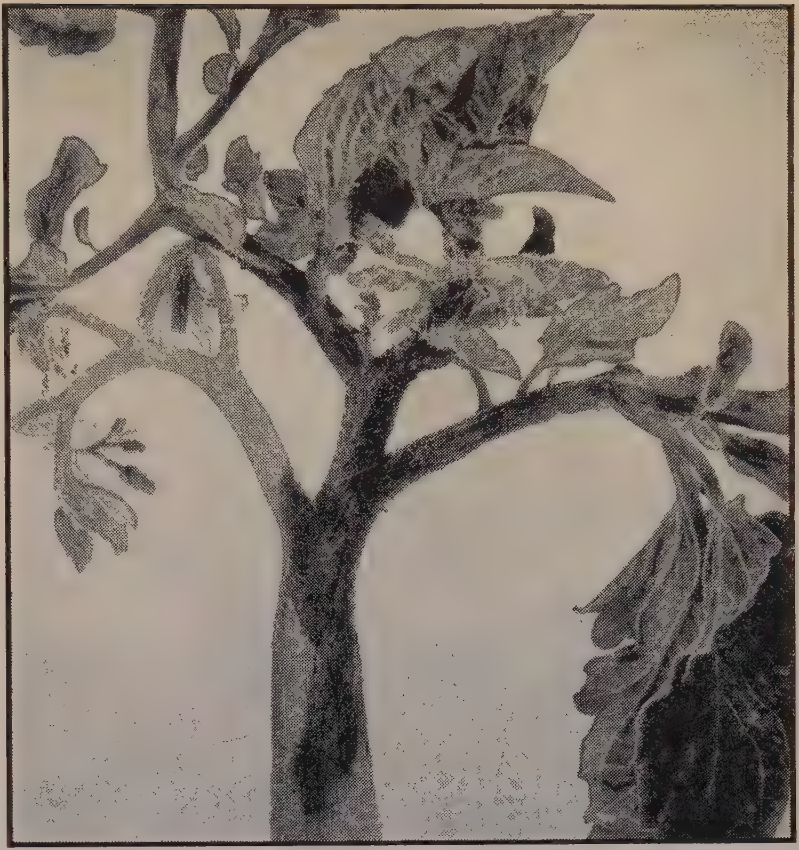
**Late blight:** Late blight, caused by the fungus *Phytophthora infestans*, is one of the commonest and most destructive diseases of tomatoes and is also common on potatoes. Although widespread throughout the Dominion, it is most difficult to control in Auckland Province, where it often causes heavy losses. The disease appears first as dark brown to black areas on the leaves and may spread to stems and fruit. Infected fruit develops russet-brown marbled areas and eventually shrivels and becomes brown.

**Septoria leaf spot:** Caused by the fungus *Septoria lycopersici*, septoria leaf spot is generally more prevalent in autumn. The older leaves are usually affected first and early infection shows as small spots having a water-soaked appearance. As the spots enlarge they become more circular and the affected tissues become sunken and darker, varying from grey to brown. Control of fungous diseases is discussed in the section on spraying (page 144).

### Virus Diseases

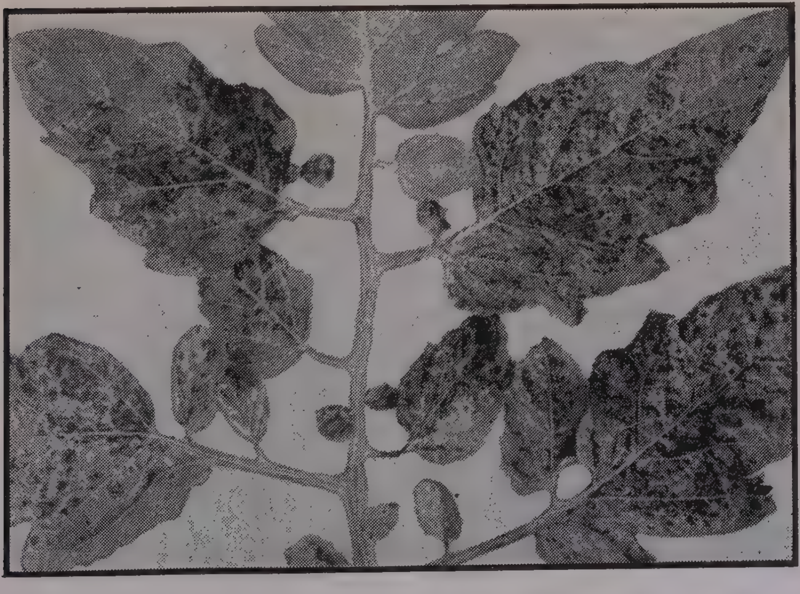
**Spotted wilt:** This disease, commonly called bronze top, is caused by a virus and is most serious, as there is no known control and affected plants do not recover. Infection shows first as small, pin-point, dark spots on the terminal shoots and leaves. The top of the plant soon becomes stunted, the young top leaves tend to curl downward, and little or no further growth is made. Irregular brown and bronze markings appear on the leaves as the disease progresses through the system of the plant, and fruits may show irregular mottling of lighter or yellowish colour or distinct concentric markings.

Control measures consist of removing and destroying infected plants as soon as the disease is noticed.



*[Department of Scientific and Industrial Research*

Tomato (late) blight (*Phytophthora infestans*) showing infection on stem (the dark colouring extending upward).



*[Department of Scientific and Industrial Research*

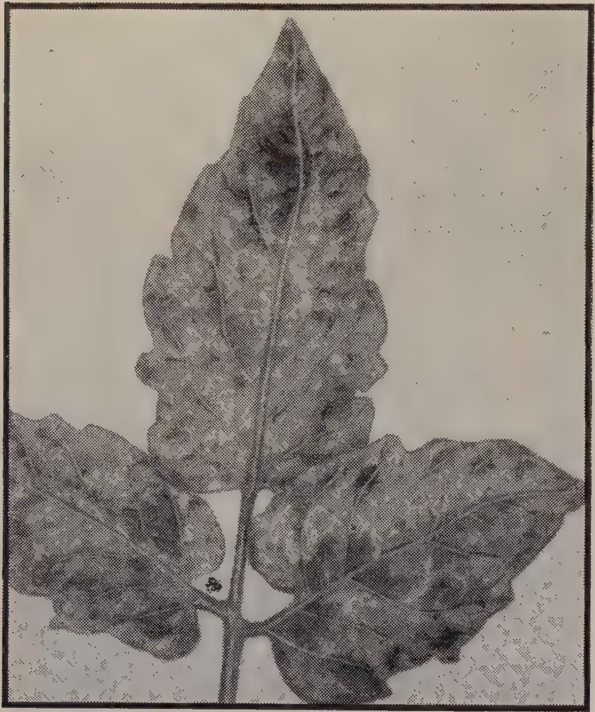
Spotted wilt, showing typical bronzing of tomato leaves.

Thrips, the main agents in the spread of the spotted wilt virus, should be kept down by spraying the plants every 7 days with D.D.D. 25 per cent. wettable powder (1oz. in 4 gallons of water or combined with the copper sprays).

**Home gardeners should not confuse D.D.D. with D.D.T., which is not recommended for spraying on tomatoes, as it may cause damage, particularly in hot weather.**

**Tobacco mosaic:** This virus causes a mottling of the leaves which is sometimes accompanied by leaf distortion, especially on dwarf varieties. The mottling shows as light yellow-green irregular areas in the leaf blade tissues. The fruit is sometimes affected and may show slight irregularity or "mistiness" in the red colouring. The disease is not as serious in its effect as spotted wilt. The virus may be spread by the hands from plant to plant when laterals are being removed or during tying-up operations. Mosaic also affects tobacco and is usually present in manufactured tobacco. As it may be spread to tomato plants by a worker who handles tobacco in rolling cigarettes, such a smoker should wash his hands thoroughly before handling clean plants. Plants badly infected with mosaic should be removed and burnt.

**Cucumber mosaic:** This virus disease causes a narrowing of the leaves of

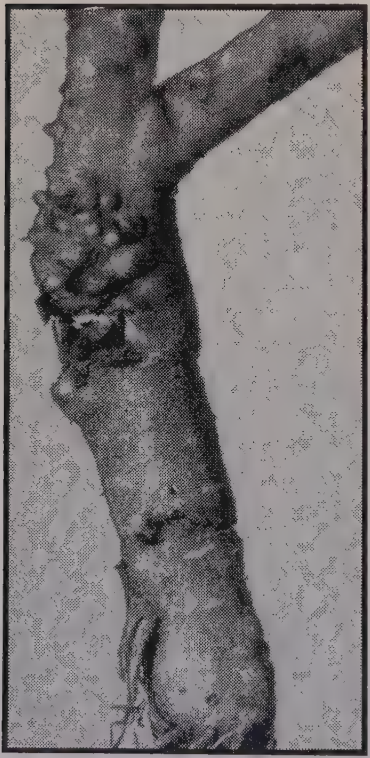


[*Department of Scientific and Industrial Research*
Tobacco mosaic, showing mottling of tomato leaves.

tomatoes to the extent that in extreme cases they are pointed and greatly reduced in size. The disease is commonly carried by aphides from nearby host plants. The virus can also be spread when plants are being pruned. As infected plants seldom produce healthy fruit, it is best to remove and burn them.

**Blossom-end Rot**

Blossom-end rot, which is fairly common, affects the fruit only. The causal agent is not disease and the condition has been attributed to sudden fluctuations in moisture, which result in the collapse of the cells at the blossom end of the fruit. Lack of water during the period of maximum fruit expansion followed by an excess of moisture appears to create the most favourable conditions for the development of blossom-end rot. In the early stages the trouble appears as a small spot at or near the blossom end of the tomato and at this stage the affected area has the appearance of a bruise, being water-soaked and dark green. As the size of the affected area increases the tissues become firm, leathery, and brown to black. At times the whole of the blossom end of the fruit becomes flattened and black. Losses from blossom-end rot can be minimised by keeping an adequate moisture supply in the soil during dry weather.



[*Department of Scientific and Industrial Research*
Dwarf tomato, showing typical external symptoms of stem borer infestation in main stem at ground level.

**Tomato Worm**

The tomato caterpillar (*Heliothis armigera*) is one of the most common garden pests. Its habit of boring into tomatoes and eating the contents has endowed it with the name tomato worm. The caterpillars vary from green to brown and have reddish or yellowish markings.

**Tomato Stem Borer**

Plants are frequently lost through the ravages of the larvae of the tomato stem borer moth (*Gnorimoschema plaesiosema*). Eggs are laid in the leaves of the tomato plant and the young caterpillars burrow into the main stem, which is hollowed out, often causing the death of the plant.

Both tomato worm and stem borer can be controlled by spraying with D.D.D. 25 per cent. wettable powder (1oz. in 4 gallons of water). For the control of stem borer spraying should begin when plants are a few inches high and for tomato worm as soon as the first fruit has set.

**Aphides**

Aphides (green fly) are tiny green insects, usually very numerous, which suck the sap and cause wilting of the foliage and a stunting of the growth of the plant. Control can be effected by spraying with nicotine sulphate at a strength of 1 : 600 plus soft soap as an activator. To make 4 gallons of spray add 1 fl. oz. of nicotine sulphate to 4 gallons of water to which 2oz. of soft soap has been added. Nicotine sulphate can be combined with Bordeaux mixture, or with the other copper compounds, but soft soap should not then be used.

## Spraying

**For the efficient control of fungous diseases and insect pests on tomatoes spray applications should be made every 7 to 10 days, according to the weather and the severity of the trouble locally. Generally, plants should receive applications of Bordeaux mixture (or a Government-certified copper compound) at the recommended strength plus 1oz. of 25 per cent. D.D.D. wettable powder from the true-leaf stage until the crop has finished.**

Four gallons of 3 : 4 : 50 Bordeaux mixture is made by adding 4oz. of bluestone (copper sulphate) and 5oz. of hydrated lime to 4 gallons of water. It is prepared as follows:—

Dissolve the bluestone in 2 gallons of water. Mix the hydrated lime to a thin paste and add it slowly to the bluestone solution, which should be stirred while this is being done. Add water to make 4 gallons of spray.

Bluestone sprays should be mixed in wooden or copper containers if possible. If mixed in galvanised-iron containers, Bordeaux sprays will cause rapid corrosion.

As an alternative for Bordeaux mixture 3 : 4 : 50 one of the certified preparations of copper oxychloride may be used. These are marketed under several proprietary names and should be used at the strength recommended by the manufacturers.

Spraying can be successful only if complete coverage is maintained. This means frequent applications of recommended sprays thoroughly and carefully applied so that all portions of the plant are wet. Failure to secure adequate control of pests and diseases is frequently the result of faulty or insufficiently frequent applications.

**Precautions**

The following precautions should be observed when nicotine sulphate is used:—

1. Avoid contact of concentrate with skin or mouth. Use rubber gloves if hands have open cuts.
2. If concentrate is spilt on the skin, wash it off immediately with soap and running water. After spraying cleanse all exposed skin in a similar manner.
3. Keep the insecticide out of reach of children.
4. Do not eat, drink, or smoke while spraying.
5. If inhalation of spray vapour causes headaches and tightness of the chest, leave the spraying area.

# Work for September

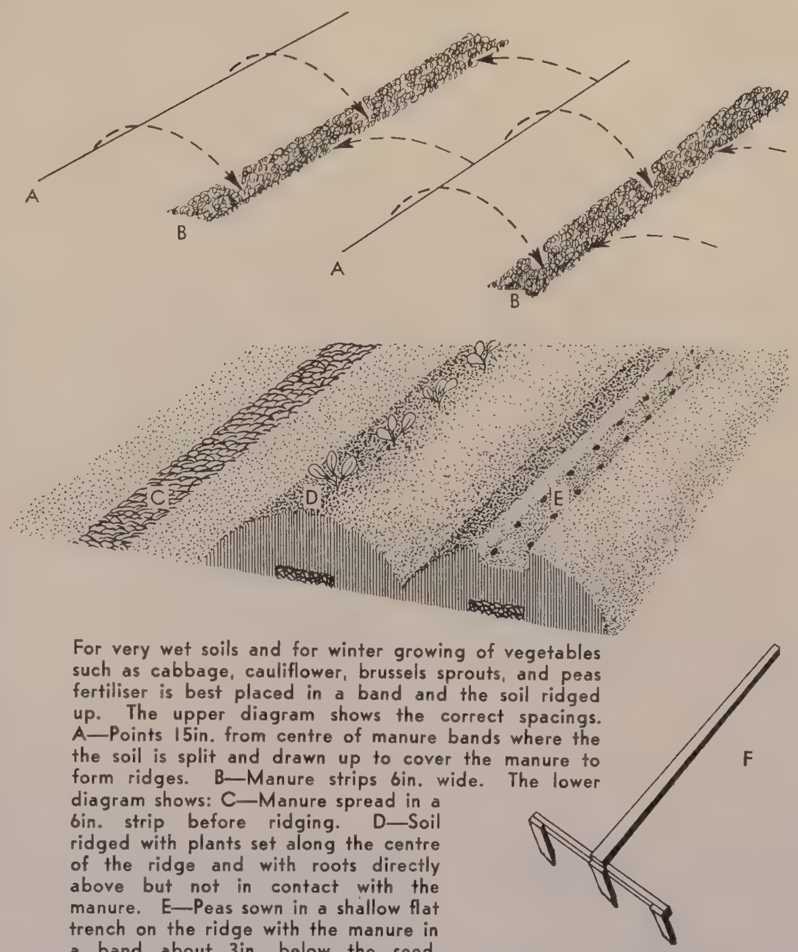
During September gardening in most districts can begin in earnest. Now that the days are longer and there is more sunshine the soil should be warm enough to promote satisfactory germination of all the hardier kinds of vegetable seeds. In northern districts where late frosts are unlikely seed of the more tender kinds may be sown toward the end of the month. Plant protection, by cloches or hot-caps, will still be necessary for frost-tender subjects if they are grown in cold localities.

To have the area in readiness for later cropping green crops should be turned in and ground left fallow during winter broken down. The soil should be loosened up around planted crops, because at this time of year frequent rains consolidate the surface and unless air can penetrate freely into the soil, plant growth is retarded. The soil should be drawn up to established crops of cabbages, cauliflowers, peas, and broad beans as they grow to provide support for the plants. When the soil is being drawn up to plants a wide rather than a narrow ridge should be formed, as this provides better support and rooting area.

Parsnips, carrots, and any other root crops which have been left in the ground over winter should now be removed before they develop seed growth. They should be used as soon as possible after digging, as crops dug at this period of the year seldom keep long if stored. Frequent attention should be given to young seedlings growing in cool frames, cloches, or boxes with a glass covering. They should be freely ventilated on fine sunny days to keep the plants from becoming drawn, and the soil should not be allowed to become too dry.

In districts where blight is troublesome tomato seedlings should be sprayed every 10 days with Bordeaux mixture (4oz. of bluestone plus 5oz. of hydrated lime to 4 gallons of water) or a certified copper compound to protect them against attack by the fungus. As a protection against insect attack 1oz. of D.D.D. 25 per cent. wettable powder should be added to each 4 gallons of spray mixture.

In most districts peas will need protection from birds. Wire netting or cotton stretched over the rows is effective, though lime dusted along the rows is sometimes satisfactory. Supports should now be constructed to accommodate runner beans and tomatoes. These are best placed in position before planting.

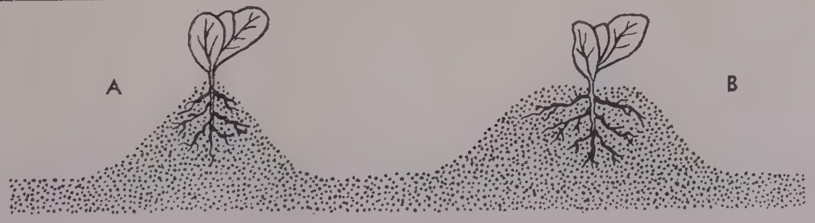


For very wet soils and for winter growing of vegetables such as cabbage, cauliflower, brussels sprouts, and peas fertiliser is best placed in a band and the soil ridged up. The upper diagram shows the correct spacings. A—Points 15in. from centre of manure bands where the the soil is split and drawn up to cover the manure to form ridges. B—Manure strips 6in. wide. The lower diagram shows: C—Manure spread in a 6in. strip before ridging. D—Soil ridged with plants set along the centre of the ridge and with roots directly above but not in contact with the manure. E—Peas sown in a shallow flat trench on the ridge with the manure in a band about 3in. below the seed. F—A wooden marker for giving the correct spacing of ridges. In addition to the marker the home gardener will require a garden line to keep rows straight, a swan-neck hoe for drawing up the soil, and a rake for levelling off the tops of ridges.

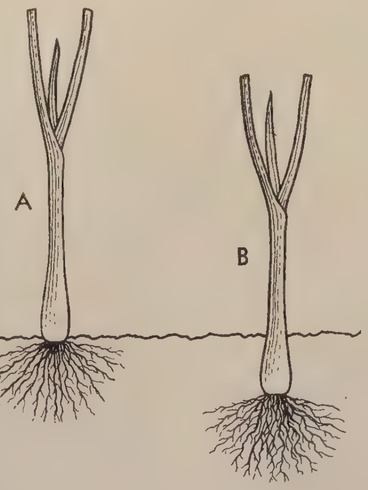
## Applying Artificial Fertilisers

For the home garden where cropping is fairly extensive broadcasting of a general base mixture is a fairly good method. Extra nitrogen needed for leaf crops such as lettuce and cabbage can be added later as a side dressing. Fertiliser that is broadcast should be well worked into the soil before sowing or planting begins.

Although broadcasting is usually fairly satisfactory, band application is best for such crops as potatoes, cabbages, and cauliflowers. For potatoes a trench should be drawn out about 4in. deep and 6in. wide and the manure sown along this trench and mixed into the soil. The tubers should be placed in position and the trench filled by drawing the soil from each side and forming a low mound. With cabbages and cauliflowers a garden line should be placed in position and the fertiliser applied in a 12in. band along the line. The fertiliser can be forked into the soil before plants are set out, or the soil can be drawn over the fertiliser to form a mound about 6in. high along which plants are set. The latter method is better for wet soils or for autumn and winter plantings.



Moulding established crops of cabbages, cauliflowers, peas, and beans. A—The wrong way of drawing the soil up to plants; there is not sufficient room for root development and the soil is liable to dry out. B—Correct method of moulding. The wide flat-topped ridge can take in and retain moisture and there is ample room for roots to develop.



Transplanting autumn-sown onions. The leaves and roots of the seedlings have been trimmed for transplanting. A is set at the correct depth, though it may appear shallow. If seedlings are planted too deep, as is B, thick-necked or irregular-shaped bulbs will result.

### Plantings

**Potatoes:** In northern or other favourable districts main-crop varieties such as Arran Chief or Aucklander Short Top (Sutton's Supreme) may be planted. Unless the seed is large, it is inadvisable to cut the tubers, as this sometimes tends to reduce the yield. Certified seed should be used if obtainable.

**Tomatoes:** A few plants can be set out in very favourable localities where there is no likelihood of a late frost and where there is protection from cool winds. Allow about 18in. between plants for tall varieties and 24in. for dwarfs, with 30in. between rows.

**Lettuce:** Plants raised under glass can be set out in well-prepared and manured beds or rows. Black cotton stretched over the bed will keep birds from eating the plants. If slugs are troublesome, the bed should be dusted on a fine evening with burnt lime, or baits containing metaldehyde (1oz. of metaldehyde to 3lb. of bran) should be spread.

**Artichokes** (Jerusalem) are easily grown and are well worth a place in gardens having sufficient space. Tubers (either cut or whole) should be planted 3 to 4in. deep and 15 to 18in. apart in rows 3ft. apart. A pound of tubers is sufficient for 25ft. of row.

**Onions:** Plants for the main crop can still be set out. A good keeping variety is Pukekohe Long Keeper.

**Cabbage:** Plants for harvesting in November and December may still be set out in the North Island. Good varieties are Golden Acre, Enfield Market, and Henderson's Succession.

**Herbs:** Mint, sage, and thyme and other herbs can still be planted if well-rooted plants are available.

### Sowings

**Peas:** Sowings can be made in all districts and good results should be obtained from the varieties William Massey, Earlicrop, Greenfeast, or Stratagem.

**Beetroot and silver beet:** These do well if sown now and the thinnings can be transplanted later. Transplants will be later in maturing, thus giving a succession. Crimson Globe and Detroit Red are good varieties of beetroot, and Lucullus and Fordhook Giant are popular varieties of silver beet.

**Leeks:** These take a long time to mature and seed sown now will produce plants for setting out in January to harvest during autumn and winter. A good variety is Musselburgh.

**Onions:** Although transplanting is mainly favoured in the North Island, some of the main-crop varieties may now be sown where they are to mature, provided the soil is friable and not very cold and wet. If the seed is sown thinly, very little thinning should be required.

**Spinach:** This matures quickly and seed of summer strains sown now will produce plants for use in about 7 weeks.

**Lettuce:** Seed can be sown in the open. Great Lakes or Neapolitan (summer strain) are suitable varieties.

**Celery:** Seed can be sown under glass for a December planting in North Island districts. The seed is very small and should be sown thinly and only lightly covered with soil. Golden Self-blanching is the most popular variety for summer production.

**Parsnips:** Seed can be sown in the North Island and in the more favoured localities of the South Island. As parsnip seed is slow in germinating, the soil should be reasonably free of weed seeds and one that is not consolidated badly by rains. In heavy soils the seed may be covered with sand instead of soil. Hollow Crown is a favoured variety.

**Beans:** A small sowing of an early variety of dwarf beans is well worth while in warmer parts of the North Island. Suitable varieties are The Prince, Pale Dunn, and Canadian Wonder.

# Radio Broadcasts during September

RADIO broadcasts to farmers will be given during September as follows:—

#### 1XH Hamilton, 12.33 p.m.

3 September—"Seasonal Problems on the Sheep Farm", by D. W. Caldwell, Veterinarian, Department of Agriculture, Hamilton.

10 September—"Weed Control", by J. R. Murray, Instructor in Agriculture, Department of Agriculture, Hamilton.

17 September—"Selling Dairy Produce", by W. T. Peterson, Federated Farmers, Hamilton.

24 September—"Blight in Potato Crops", by C. E. K. Fuller, Horticultural Instructor, Department of Agriculture, Hamilton.

#### 1YZ Rotorua, 7.15 p.m.

3 September—"Control of Vegetable Pests and Diseases", by F. L. Bailey, Horticultural Instructor, Department of Agriculture, Tauranga.

17 September—"Supplementary Crops for the Dairy Farmer", by S. R. Hewitt, Instructor in Agriculture, Department of Agriculture, Whakatane.

#### 3YA Christchurch

3 September (7.15 p.m.)—Review of the "New Zealand Journal of Agriculture", by E. G. Smith, Fields Instructor, Department of Agriculture, Rangiora.

10 September (7.15 p.m.)—"The Meat Inspection Service", by N. Skinner, Supervising Meat Inspector, Department of Agriculture, Belfast.

21 September (12.20 p.m.)—"Newer Therapeutants and Their Application", by J. Coombe, Horticultural Instructor, Department of Agriculture, Christchurch.

#### 4YA Dunedin, 9.15 p.m.

9 September—"Overcoming Unthriftiness in Lambs", by E. A. Pratt, Veterinarian, Department of Agriculture, Oamaru.

23 September—"Overseas Methods in Pasture Investigations", by J. M. Hercus, Instructor in Agriculture, Department of Agriculture, Dunedin.

#### Regular Sessions

1XH Hamilton, Tuesdays at 8 p.m. (Frankton stock market report), Wednesdays at 12.33 p.m. (report from Ruakura Animal Research Station), Thursdays at 12.33 p.m., Fridays at 8 p.m. (Waikato stock review).

1XN Whangarei, Mondays at 8 p.m., Wednesdays at 8 p.m. (Northland stock market report), Fridays at 8 p.m.

1YA Auckland, Mondays at 7 p.m. (Auckland stock market report), Tuesdays at 12.35 p.m., Wednesdays at 7 p.m., Thursdays at 12.33 p.m.

1YD Auckland, Thursdays at 7.30 p.m.

1YZ Rotorua, Mondays at 12.33 p.m. (Waikato stock review), fortnightly on Tuesdays at 12.33 p.m. (Federated Farmers' session), Tuesdays at 6.55 p.m. (Frankton stock market report), Thursdays at 12.33 p.m., Thursdays at 7.15 p.m. (farm talks alternating with session for Bay of Plenty farmers), fortnightly on Fridays at 12.33 p.m. (pig council talk).

2XA Wanganui, Wednesdays at 8 p.m. (Wanganui stock sale report), Thursdays at 8 p.m.

2XG Gisborne, Tuesdays at 8 p.m.

2XN Nelson, Thursdays at 8 p.m.

2XP New Plymouth, Thursdays at 8 p.m.

2YA Wellington, Mondays at 7.15 p.m., Thursdays at 12.33 p.m., Fridays at 7 p.m. (Feilding stock market report).

2YZ Napier, Tuesdays at 12.12 p.m. (Hawkes Bay orchardist session), Tuesdays at 7 p.m., Wednesdays at 7.15 p.m. (Hawkes Bay-Poverty Bay livestock market report), Thursdays at 12.33 p.m.

2ZA Palmerston North, Mondays at 12.33 p.m., Fridays at 8.45 p.m. (Feilding stock market report).

3XC Timaru, Tuesdays at 8 p.m., Thursdays at 8 p.m.

3YA Christchurch, Mondays at 12.20 p.m., Wednesdays at 7.15 p.m. (Addington stock market report), Thursdays at 12.33 p.m. and 7.15 p.m.

3YZ Greymouth, Thursdays at 12.33 p.m.

4YA Dunedin, Wednesdays at 7.20 p.m., Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.33 p.m. and 7.15 p.m., Tuesdays at 7.15 p.m. (Lorneville stock market report), Thursdays at 12.33 p.m.

## Recent Research Work

# PASTURES

**INVESTIGATIONAL work with pasture species has recently been concentrated on problem soils such as peats, sands, light and droughty soils, and tussock areas. Considerable progress has been made in defining species of value under these conditions.**

### DROUGHTY LAND

SOME 40 trials with pasture species were sown on light or droughty land, most being in Canterbury. In all these trials cocksfoot, Montgomery red clover, and subterranean clover (especially the Tallarook variety) have been the outstanding species both to establish and to survive. Lucerne also established well, but when sown alone it usually gave too open a sward and allowed heavy weed invasion. Other useful species were alsike clover, crested dogstail, sheep's burnet, chicory, and yarrow. Ryegrass usually established well, but dried off in summer and became coarse and unpalatable while cocksfoot at this time was still giving good food. Lespedeza was tried in one trial, but did not survive a dry summer and a cold, frosty winter. *Phalaris tuberosa* was satisfactory on light and droughty land, as it survived both drought and frost. It combined well with lucerne as also did cocksfoot. It was found that a moderate intensity of grazing gave best results on this type of land. This allowed annual plants to re-establish from seed, and the maintenance of a surface cover conserved soil moisture. Under a long period of spelling many plants dried off, whereas they maintained some growth with moderate grazing. In all trials lime and phosphate applications gave marked responses.

### COCKSFOOT AND LUCERNE

Several trials have investigated the seeding rates of cocksfoot and lucerne in a lucerne-cocksfoot mixture. Rates of cocksfoot varying from 2½lb. to 12lb. with 12lb. of lucerne were compared. All rates gave a satisfactory sward in the early life of the pasture, but later the low rates of cocksfoot resulted in a patchy, open sward, and in the heavy rates the grass dominated the lucerne. For a well-balanced lucerne-cocksfoot mixture of high productivity rates up to 5lb. of cocksfoot and 12lb. of lucerne gave best results in most localities. Methods of sowing were compared. In most trials drilling gave better establishment than broadcasting, but after the first year differences were usually small. Cover crops in trial sowings did not aid pasture establishment, as they gave too much competition for available moisture, although they tended to reduce the amount of weeds.

### *PHALARIS TUBEROSA*

Numerous trials have been carried out to investigate the use of *Phalaris tuberosa* in seed mixtures to be sown under a variety of conditions such as on light and droughty land and to determine its use in special-purpose pasture mixtures. In all trials the establishment was good and was followed by initial vigorous growth, especially in spring. However, this was often followed by a period of slower growth during which it appeared that the *Phalaris tuberosa* could not compete with volunteer and weed grasses and with red clover and in which in some cases it was completely smothered. Within two seasons after sowing only a few spindly, low-producing plants remained in most trials. *Phalaris tuberosa* is more tolerant of hot, droughty conditions than perennial ryegrass, but cocksfoot is often just as good or better under these circumstances. *Phalaris tuberosa* combines well with lucerne and although this mixture in trials has not produced as well as the cocksfoot-lucerne combination, the grass-lucerne balance is more easily maintained because of the non-aggressive nature of phalaris. Because of its growth habit it does not usually persist well under hard grazing. In all trials except one the unpalatability of phalaris was very noticeable even when in a succulent condition.

—*P. B. LYNCH*

* * * *

### CONTROL OF WEEDS IN GRASS SEED CROPS

EXPERIMENTAL work clearly showed the value of hormone weedkillers for the control of thistles, hedge mustard, and other common weeds of grass seed crops. No damage occurred to the grass crop, provided the application was made before flower head formation. The standard practice is to hard graze, spray, then shut the area up for a seed crop. Attention is now being given to the possibility of suppressing annual weed grasses such as barley grass, hair grass, and goosegrass in stands of perennial grasses. Trials have been started using the two grass killing chemicals I.P.C. and T.C.A. at low rates. The rates employed are sufficient to kill germinating annual and seedling grasses. The ultimate effect on the established perennial grasses is still to be determined, but so far no visible damage has occurred.

### TOLERANCE OF CLOVERS TO WEEDKILLERS

Numerous trials in the past have shown that clovers offer varying tolerances to weedkillers. White clover is more tolerant to hormone weedkillers than red clover or annual clovers. Clovers show a marked variation in tolerance to various formulations of weedkillers. Experimental work has proved that the sodium salt of M.C.P. is the most selective preparation, followed by the water-based preparations of 2,4-D, the water-based ester of 2,4-D, and the butyl ester of M.C.P. The oil-based esters of 2,4-D are particularly lethal, especially in the early stages of growth of the clovers. Trials have shown that, provided the area is closely grazed and spraying is conducted after 2 or 3 days of fine weather, most weeds in white clover crops can be controlled without damage to the crop. More damage occurs with red clover. A particular weed of red clover stands is docks. Trials have shown that docks may be controlled with the water-based ester of 2,4-D and with the N-butyl ester of M.C.P. Trials are being commenced to determine whether red clover will show sufficient tolerance to these chemicals to permit the eradication of docks in such crops. Further work is being carried out on the elimination of weed clovers such as suckling clovers in established perennial clovers.

—*L. J. MATTHEWS*

Heading photograph by Green and Hahn.

# Care of Livestock during September

Contributed by the Animal Research Division

### CARE OF EWES WITH TWIN LAMBS

FOR the first month or 6 weeks of life a lamb depends almost entirely on its mother's milk. Ewes are capable of producing more milk than a single lamb can drink in the early part of lactation. Twins, on the other hand, can soon drink all the milk which the ewe can produce. For this reason ewes with twin lambs should be drafted off and grazed together on good paddocks. Separation is most easily done immediately after lambing.

### ROTATIONAL GRAZING OF CALVES

Well-reared cattle at Ruakura out-produced their poorly reared mates by a total of 40lb. fat over the first two lactations, when both groups were well fed from first calving onward. Frequent changes to good clean pasture are essential if calves are to be successfully reared. (See "Care of Livestock" notes in last month's "Journal".) This rotational grazing avoids deaths in winter, eliminates the need for drenching against worms, and produces yearlings 100lb. heavier than those kept in the one paddock for weeks at a time.

### FEEDING THE MILKING HERD

Autumn-saved pasture is almost equal to high-quality spring pasture as a milk-producing fodder. It should, therefore, be rationed to the milking cows to make it last until the spring feed comes away and hardens up. An electric fence is essential for efficient utilisation, enabling the pasture to be grazed in small breaks. Unless sufficient reserves of this pasture are available for full feeding, the remainder of the feed should be made up with silage. Make sure enough hay is retained to balance the lush spring growth.

When the autumn-saved pasture is finished the herd should be rotated round the farm. Paddocks should be small enough to maintain a concentration of 20 to 30 cows per acre. If necessary, larger paddocks may be subdivided with the electric fence. The aim should be to graze pasture when it is 4 to 6in. high, as it is then at its most nutritious stage. Cows should not be kept for more than 1 or 2 days in the paddock. If necessary, cleaning up after them should be done with dry stock.

### CARE OF PIGS

Late-farrowed spring litters should receive special attention, as they will be approaching weaning age. Creep feeding is a very important factor in the production of heavy weaners, and best results will be obtained by having a supply of meal and milk always before the litter. Weaned pigs must be well fed, and if meal has been used before weaning, its use should be continued for at least a fortnight to avoid an after-weaning check. The meal ration will be reduced as the skimmed milk supply increases. It is preferable to feed weaners with meal up to half their daily rations and give the milk saved to the store pigs rather than feed meal to the older pigs at this stage.

After weaning sows should receive sufficient milk and meal to enable them to regain the weight lost during previous suckling. They should be hand-mated, and once safely in pig may be allowed to subsist on good pasture.

### MASTITIS

Mastitis is usually most prevalent in spring. Milk from all quarters should be carefully examined each day in a strip cup. If there is any abnormality, the quarter should be treated without delay, three tubes of penicillin cerate being used at 24-hour intervals. Prompt treatment at this time of the year will greatly reduce loss in production from light or dry quarters.

### VACCINATION AGAINST SCABBY MOUTH

On farms where scabby mouth occurs each new crop of lambs should be vaccinated, and this is most conveniently done at marking. If lambs are not protected, they are liable to suffer a severe check, as the disease makes eating very painful. The vaccine gives very good protection if properly used. Care is necessary to keep the needle prong clear of grease, as if it becomes blocked, no vaccine is applied and lambs may still be susceptible. Ewes which have not previously been exposed to the disease should be vaccinated at the same time as the lambs.

### COCCIDIOSIS IN POULTRY

To prevent coccidiosis in chickens it is necessary to keep them growing steadily. Any check is dangerous. Cleanliness is very important, as the disease spreads through the soiling of food by droppings. If an outbreak occurs, sulphamezathine or sulphaquinoxaline should be used in the drinking water. Full particulars of dosage may be obtained from the Department of Agriculture's Poultry Instructors.

### X CHICK DISEASE

The work carried out on X chick disease during the last 2 years has shown it to be a form of vitamin E deficiency, possibly arising from the feeding of certain batches of wheat. Outbreaks of X chick disease have been confined so far to the South Island, and poultry farmers in the areas affected in previous years are advised to add 5 per cent. wheat-germ meal to the chick mash as a precautionary measure.

An article describing the results of the investigation carried out on this disease will appear in the September issue of the "Journal of Agriculture".

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## Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during June and for the 11 months ended 30 June 1953, with comparative figures for the same month and 11-monthly period of 1951-52, have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

### BUTTER

| Period | | Tons | | Percentage inc. or dec. |
|---|---|---|---|---|
| | Creamery | Whey | Total | |
| June 1953 .. .. .. | 758 | 27 | 785 | — |
| June 1952 .. .. .. | 430 | 11 | 441 | — |
| Increase or decrease .. | +328 | +16 | +344 | +78.004 |
| 11 months ended 30/6/53 | 160,025 | 3,147 | 163,172 | — |
| 11 months ended 30/6/52 | 154,898 | 2,647 | 157,545 | — |
| Increase or decrease .. | +5,127 | +500 | +5,627 | +3.571 |

Butter in store at 30 June 1953 was 10,513 tons

### CHEESE

| Period | | Tons | | Percentage inc. or dec. |
|---|---|---|---|---|
| | White | Coloured | Total | |
| June 1953 .. .. .. | 1,801 | — | 1,801 | — |
| June 1952 .. .. .. | 1,145 | — | 1,145 | — |
| Increase or decrease .. | +656 | — | +656 | +57.292 |
| 11 months ended 30/6/53 | 103,283 | 140 | 103,423 | — |
| 11 months ended 30/6/52 | 91,047 | 751 | 91,798 | — |
| Increase or decrease .. | +12,236 | —611 | +11,625 | +12.663 |

Cheese in store at 30 June 1953 was 19,511 tons

If these figures are converted into butterfat equivalent, there is an increase of 5.462 per cent. in butterfat graded for the 11 months as compared with the corresponding period of the preceding season. The above figures refer only to butter and cheese graded for export, and owing to diversions which may take place from time to time, they are not necessarily a true indication of production trends.

◆

# Fodder Crops and Small Seed Production

## Seasonal Notes by the Extension Division

THERE is still a place for annual fodder crops on many dairy farms, particularly where their production is combined with a plan for systematic pasture renewal. Pastures on many dairy farms consist largely of inferior grasses which could with advantage be replaced with high-producing strains of better species, and opportunity can be taken during cultivation for fodder crops and pasture to level fields to allow for efficient sweeping with the buckrake when later the fields are ensiled.

### TOWN MILK SUPPLY

THE financial return of a town milk supply herd is closely associated with the quantity of milk supplied during autumn and winter. One way to increase this winter quota of milk is by growing supplementary crops. The most popular forage crops in the Auckland supply area are soft turnips and chou moellier; soft turnips are used to increase the milk supply during autumn and chou moellier during late autumn and winter.

### SOFT TURNIPS

Soft turnips sown in October are ready for feeding out in January. When the crop is needed for more than a 6-week period successive sowings should be made. About 5 to 7 acres of turnips are required for 50 milking cows, and the crop should be pulled and fed out or grazed in small breaks divided by an electric fence. If the crop is fed off, the herd should go on the break for a short period only immediately after milking.

### CHOU MOELLIER

Chou moellier is a valuable crop for winter feeding, and to obtain full advantage of the feed produced the crop is best cut and fed out to the herd. Where labour for hand feeding is short the crop can be grazed in breaks as with soft turnips, and here again to avoid the possibility of taint to the milk the period of feeding should be short. For late-summer or autumn feed the crop should be sown in September or October, and for winter feed in November or early December. About 5 acres are required for 50 milking cows.

—*J. F. TILL*

* * *

### GRAZING RYEGRASS SEED AREAS

WITH ryegrass seed production it has become common practice to take the grass seed harvest from first-year stands that have been autumn sown with a simple mixture of ryegrass and white clover. Greater yields and higher germinating samples are usually obtained from these younger stands than from seed harvests in the second or subsequent seasons. After February sowings areas intended for seed production should be control grazed throughout late autumn and early winter (April-May) to retain growth at the 2 to 3in. stage. During mild seasons lenient grazing may continue throughout winter, or if feed is required for lambing ewes, the area can be spelled for early-spring feed. During severe winters and in spring grazing should not be severe, though at no time should growth be allowed to get out of control. On light land perennial ryegrass seed stands are normally closed for seeding in early October, but on heavy land and in wet seasons closing is postponed until later in the month. The aim should be to have the area grazed relatively closely (2 to 3in.) and evenly at the time of closing. Any uneven growth should be cleaned up either by topping or by a quick grazing with concentrated stocking immediately before the area is closed. Grazing of Italian and short-rotation ryegrass should be along the lines recommended for perennial ryegrass, though owing to their tendency toward more vigorous growth, they may demand closer attention to ensure adequate growth control. They may be closed for seeding 7 to 10 days later than perennial ryegrass. When seed is being taken from older, less vigorous swards the area should be closed up 7 to 10 days earlier than for first-year stands.

### GRAZING CLOVER SEED AREAS

White clover seed crops are generally taken in the second and also often in the third years of the life of ryegrass-white clover seed stands. When growth has recovered after the ryegrass harvest the area should be closely grazed throughout late autumn and winter to suppress grass growth and attain a clover-dominant sward. This close, continuous grazing should be maintained throughout spring, especially on the heavier, more fertile soil types. Keeping the sward bared down not only encourages clover dominance but leads to profuse and more even flower-head development and checks the excessive foliage growth that may otherwise hamper seed maturity and threshing. White clover seed areas are normally closed up in late October-November, when the flower buds are beginning to appear. In dry seasons and on light soils they may be closed early in this period. On heavy soils and during wet seasons later closing is advisable. Should wet weather enforce strong foliage growth shortly after closing, it is wise either to top the area or quick graze it with a large mob of sheep during the second half of December.

—*N. H. GREAVES*

* * *

### HYBRID SEED MAIZE

THE introduction of hybrid seed maize to New Zealand growers in the last few seasons has completely changed the pattern of varieties now being grown. For several years the Department of Agriculture has undertaken the production of seed of Pfister Hybrid No. 360 from single-cross parent material obtained each year from the American breeders of this hybrid. Because of its high yield, uniform grain, and suitability to a wide range of soils and climates, Pfister No. 360 has virtually displaced all local varieties. Locally grown Certified seed is cheaper than imported hybrid seed would be and gives better yields of grain. Also the production of the hybrid seed locally means an appreciable saving in dollar expenditure. The Department of Agriculture has tried out a wide range of hybrid types from the United States of America, but though some are higher yielding under favourable conditions, none has yet been found which could be regarded as an all-round improvement on Pfister No. 360. Certified seed maize of this hybrid is available through seed merchants from the Department of Agriculture, Gisborne, and growers wishing to obtain supplies should arrange with their local merchants to obtain it. It is not wise to use again for seed the grain from an area sown with Certified hybrid seed, as some of the hybrid vigour of the true hybrid is lost in the next generation. This procedure should be countenanced only when it is impossible to obtain Certified seed. Then care should be taken to see that Certified seed was planted for the crop from which the seed is to be taken, and that the crop was growing in reasonable isolation from other types of maize and also from sweet corn.

—*H. de O. CHAMBERLAIN*

* * *

### EFFECT OF WEEDKILLERS ON CLOVERS

TRIALS have demonstrated that less damage is done to clovers if water-based preparations of M.C.P. and 2,4-D are used for the control of herbaceous pasture weeds such as buttercups, thistles, and ragwort. Clover damage is reduced to a minimum if hard grazing is carried out during dry weather immediately before the spray application. This has two advantages; the leaf area of the clover is reduced and therefore less spray is taken up by the clover, and the weeds are fully exposed to the spray.

—*L. J. MATTHEWS*

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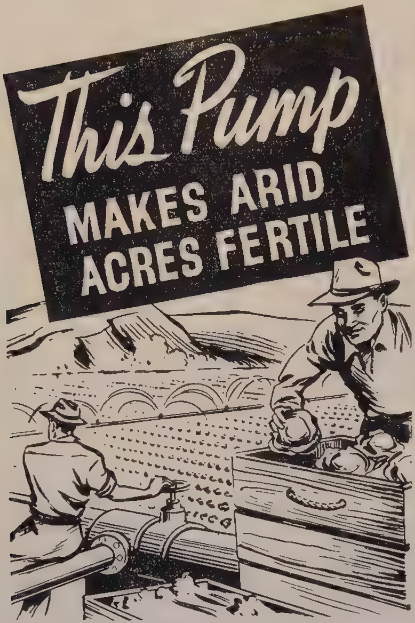
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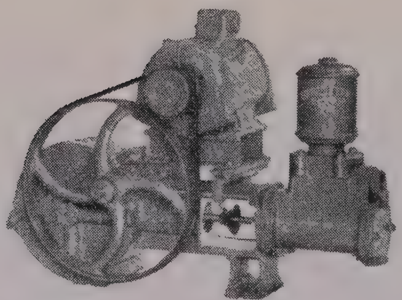

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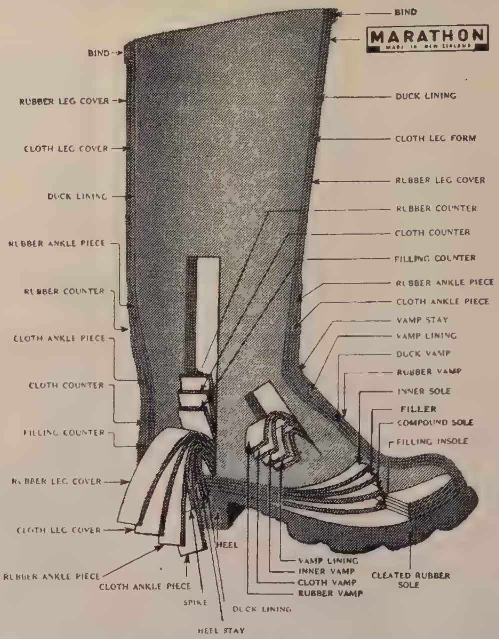
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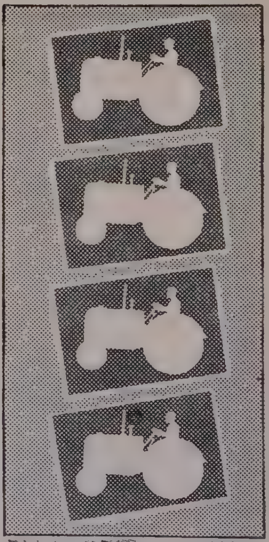

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HEADING PHOTOGRAPH: The Bay of Plenty is noted for its production of citrus and sub-tropical fruits. The illustration shows well-kept horticultural holdings near Tauranga. Rendell's photo.

# Horticultural Production in the Bay of Plenty

FEW districts in New Zealand offer better possibilities for horticultural development than the Bay of Plenty, which, with its many natural advantages, is noted not only for its production of citrus and other sub-tropical fruits, but as a scenic and holiday resort. The mild climate with a generous and well-distributed rainfall favours the production of a wide range of horticultural crops as well as citrus and sub-tropical fruits, which are among the most important. The development and present production of these crops are reviewed and the possibilities of their expansion discussed in this article by F. L. Bailey, Horticultural Instructor, Department of Agriculture, Tauranga.

LAND used for commercial horticultural crops in the Bay of Plenty is confined mainly to the coastal belt extending some 200 miles between Waihi and Waihau Bay east of Opotiki. The great bulk of the crops produced, however, are grown in Tauranga County round the town of Tauranga and near Te Puke and Katikati. Near Whakatane vegetable crops and small quantities of fruit are grown, but overall horticultural production does not nearly equal that of Tauranga County in the Western Bay of Plenty. Round the towns of Tauranga and Te Puke production of citrus and sub-tropical fruits is predominant, but near Katikati production of onions and other vegetables is more favoured.

In pockets along the whole coastal area of the Bay of Plenty and on the islands of Matakana and Motiti off the coast at Tauranga Maori growers produce large quantities of kumaras for disposal through vegetable markets and also for their own use.

## Development of Horticultural Industries

Of the commercial horticultural industries the citrus industry was the first to be established. Citrus fruits have been grown for many years in the Bay of Plenty, but it was not until about 1910 that commercial planting began near Tauranga. About 1915 the first commercial planting was made at Te Puke and an area was also planted in pip fruits. Extensive planting of citrus trees did not take place until after the First World War, when orchards were developed mainly in areas within a 5-mile radius of Tauranga.

Development and production of citrus fruits centred round Tauranga until after the Second World War, when several commercial plantings were made at Te Puke, and a few small orchards were developed near Katikati.

Tree tomatoes, Chinese gooseberries, passion fruit, and feijoas are the sub-tropical fruits chiefly produced in the district, but with the exception of passion fruit they were not extensively produced until after the war started in 1939. The shortage of imported fruits during the war caused a keen demand for sub-tropical fruits, and many plantings have been made on small holdings round Tauranga and other parts of the Bay of Plenty during the past 10 to 12 years.

Commercial market gardening in the Bay of Plenty developed about the same time as sub-tropical fruit growing. There was ample evidence of the area's capabilities in this respect during the war, when large quantities of vegetables were grown near Whakatane and at Katikati and Tauranga for supply to the Armed Forces.

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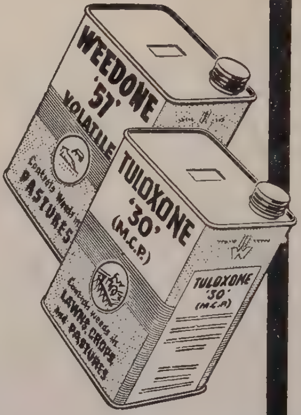

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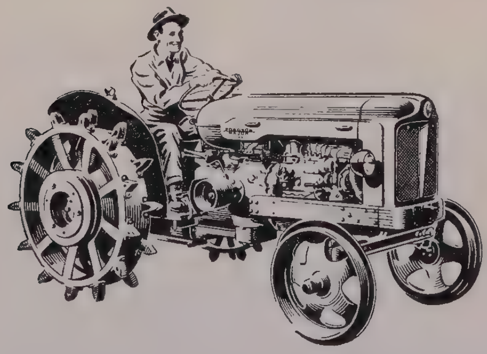

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## Climate

Broadly, the climate of the coastal area of the Bay of Plenty may be described as sub-tropical. Annual rainfall varies between 50 and 60in. and is usually fairly evenly distributed, but in some summers dry spells are not uncommon. There are not many severe frosts, but in some seasons they are of sufficient intensity to injure tender plants growing in low-lying or over-sheltered localities.

As a rule prevailing winds are seldom cold and only occasionally are there high winds. Average annual hours of sunshine are among the highest recorded in New Zealand and the coastal belt is almost entirely free from fogs.

Because of the long growing season and lack of intensity of winter frosts, some crops such as raspberries, currants, apricots, and cherries do not thrive as they do in the colder districts of New Zealand.

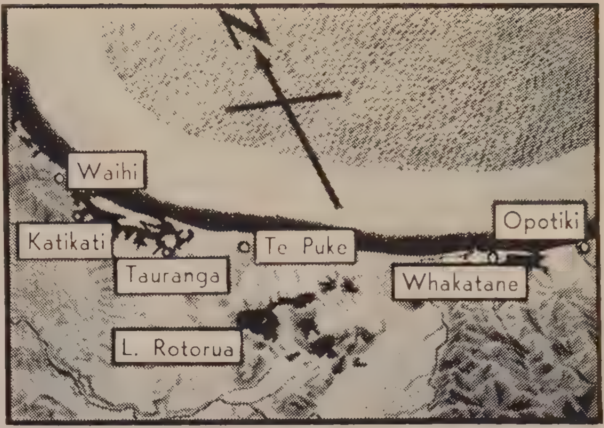
**The climate favours rapid growth of plants and trees, but it is also equally favourable for weed growth and for the breeding of insect pests and diseases. Good cultural practices combined with adequate pest and disease control are therefore essential for the production of first-quality crops.**

## Soils

The soils producing the bulk of the horticultural crops are in general light pumice loams which tend to be slightly heavier round the coast. They are light and open in texture, naturally deficient in phosphate and organic matter, but very free working, and the porous subsoil provides excellent drainage. Soils in areas suitable for horticultural cropping never pug and even after prolonged heavy rain it is only a short time before they can be worked with implements. They warm up quickly in spring, but because of their light, open texture, the heat is lost rapidly if changes of temperature occur within short intervals. For that reason they do not produce very early crops, except in isolated localities favourably situated. In spite of their light and open texture, the soils of the district appear to retain moisture reasonably well during dry periods at a depth effective for most horticultural crops.

## Citrus Fruits

At the beginning of 1952 the area devoted to the production of citrus fruits in the Bay of Plenty was estimated to be about 540 acres. In Table 1, the present areas of the various kinds of citrus fruits are shown with the estimated production for 1951. Production varies from season to season, but that for 1951 was average and gives a fair indication of a normal year's yield.

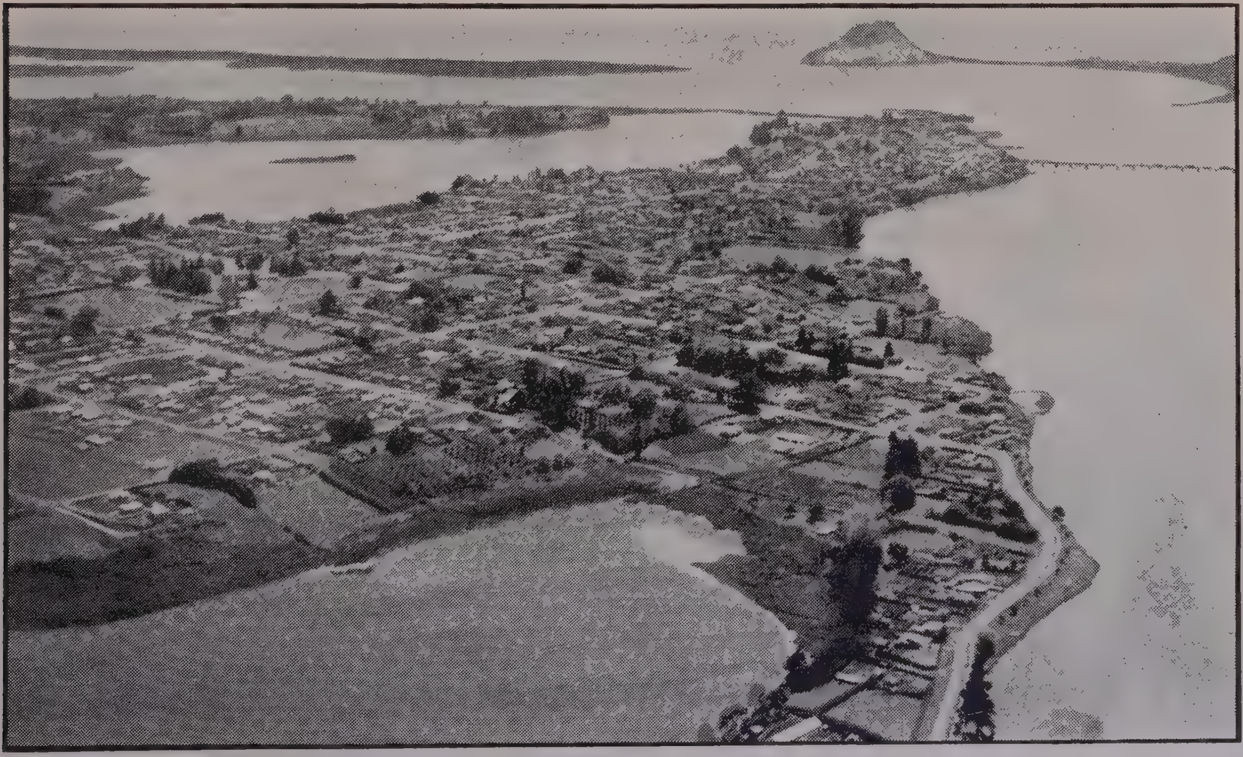


[*New Zealand Education Department map*

**TABLE 1—ESTIMATED PRODUCTION OF CITRUS FRUITS IN 1951**

| Variety | Area (acres) | Production (packed bushels) |
|---|---|---|
| Standard lemons .. | 260 | 62,100 |
| Meyer lemons .. .. | 30 | 3,150 |
| New Zealand grapefruit | 150 | 44,000 |
| Wheeny grapefruit .. | 45 | 550 |
| Sweet oranges .. | 40 | 2,600 |
| Others .. .. .. | 15 | 200 |
| Totals .. .. | 540 | 112,600 |

About half the area is planted in standard lemons. In the earlier years the industry was developed mainly round the standard lemon, and in plantings of commercial orchards the tendency has been to regard the



Tauranga, main centre of horticultural production and port of the Bay of Plenty. [*Rendell's*

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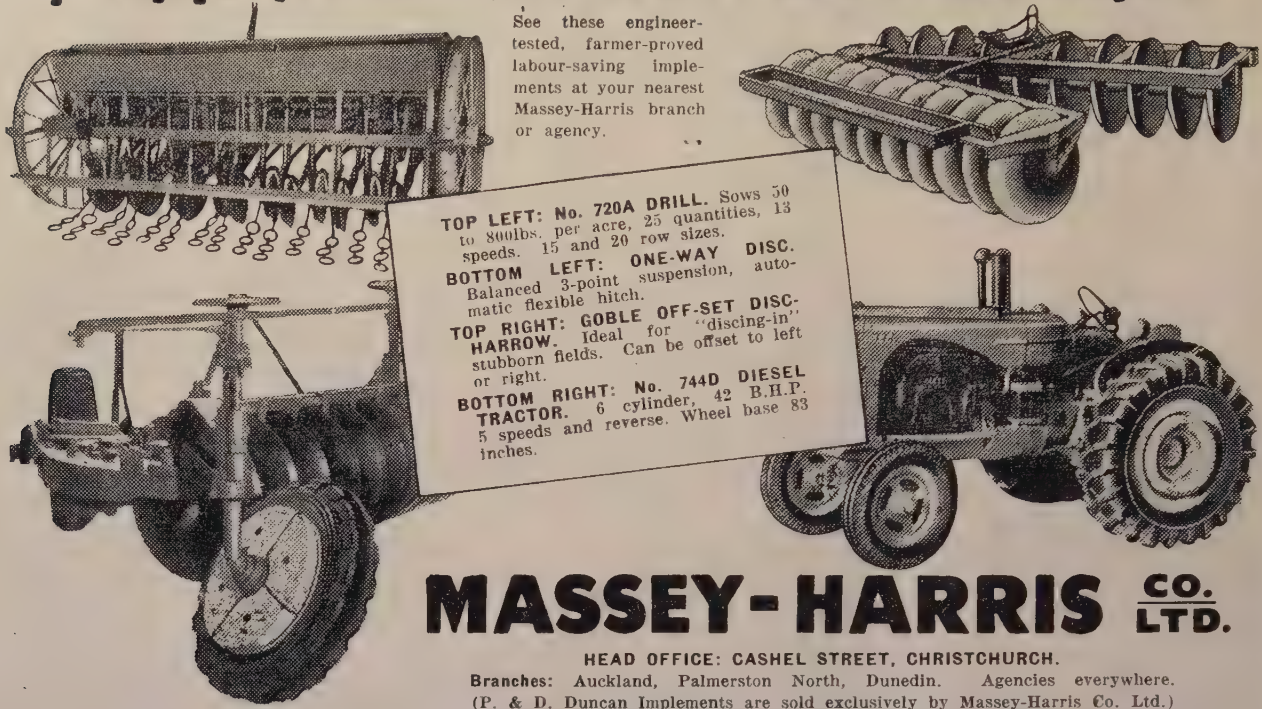

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standard lemon block as the "bread and butter" of a holding. A modern citrus packing house operates in Tauranga to handle the packing of standard lemons produced in the Bay of Plenty, and distribution and marketing of the fruit are under the direction of a national lemon-marketing committee. Under the present system of marketing a grower is not required to pack and market standard lemons, and he is thus able to concentrate on production.

Next to standard lemons in importance is New Zealand grapefruit. This fruit, and standard lemons form the bulk of an average citrus holding. Meyer lemons, sweet oranges, and other citrus varieties are grown to a less extent, but in most instances a few trees are found on nearly all citrus orchards, some holdings containing large numbers of Meyer lemons.

Packing and marketing of citrus fruits other than standard lemons are the responsibility of the grower, who either sells his fruit at the auction marts or by private treaty. In Tauranga a fruit growers' society has a co-operative packing shed and will pack and distribute both citrus and sub-tropical fruits, for which service members pay. The society meets the needs of the grower who cannot afford the time to pack or is unable to secure suitable labour.

## Sub-tropical Fruits

Closely allied in the Bay of Plenty with the growing of citrus fruits, the production of sub-tropical fruits is a newer industry, but it has made rapid progress. Only a few acres were under production some 10 to 12 years ago, but the area was estimated to total 210 acres at the beginning of 1952. Production, like that of citrus, varies according to the season.

For 1951 the estimated areas and the production of the different sub-tropical fruits are shown in Table 2.

**TABLE 2—ESTIMATED AREAS AND PRODUCTION OF SUB-TROPICAL FRUITS IN 1951**

| Kind of fruit | Area (acres) | Production (tons) |
|---|---|---|
| Tree tomatoes .. | 112 | 350 |
| Passion fruit .. .. | 42 | 60 |
| Chinese gooseberries . | 44 | 60 |
| Feijoas .. .. | 12 | 18 |
| Totals .. .. | 210 | 488 |

[Rendell's

Portion of a 12-year-old block of standard lemon trees. Standard lemons are the principal citrus fruit grown in the Bay of Plenty.

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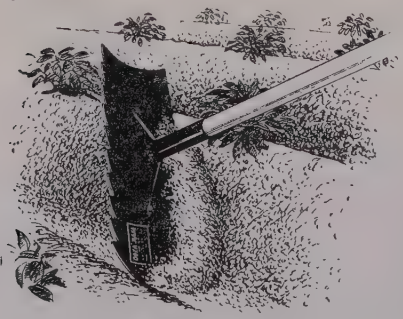

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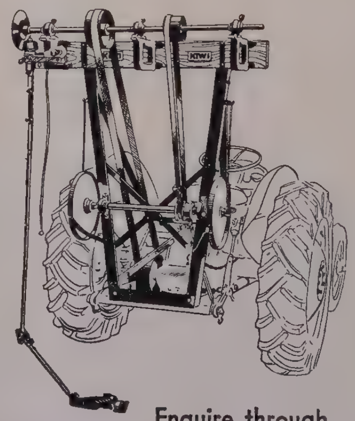

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Many of the trees and vines included in Table 2 are non-bearing and contribute little to the total production. Much of the sub-tropical fruit is produced by growers who are primarily citrus growers, but there are some holdings where sub-tropical fruits provide the main source of income.

Expanding production, faults in packing and marketing methods, and alleged consumer ignorance led sub-tropical fruit growers in 1947 to form an association to deal with the many problems associated with the culture and successful marketing of their product. Such organisations often are able to obtain concessions for their members that are not possible by individual efforts. Three associations (two in Tauranga and one in Te Puke) look after the welfare of both citrus and sub-tropical fruit growers.

## Vegetable Crops

Though not as well known for its vegetable crops as for its citrus and sub-tropical fruits, the Bay of Plenty nevertheless produces quite a substantial tonnage of vegetables for the Auckland and Waikato markets. Registered market gardens totalled 160 acres in 1951, and it is estimated that an additional 250 to 300 acres are used annually for early potato, onion, and kumara growing. Soil types are very suitable for the production of root crops and, because these crops transport well, they are grown by a number of gardeners in preference to leafy vegetables.

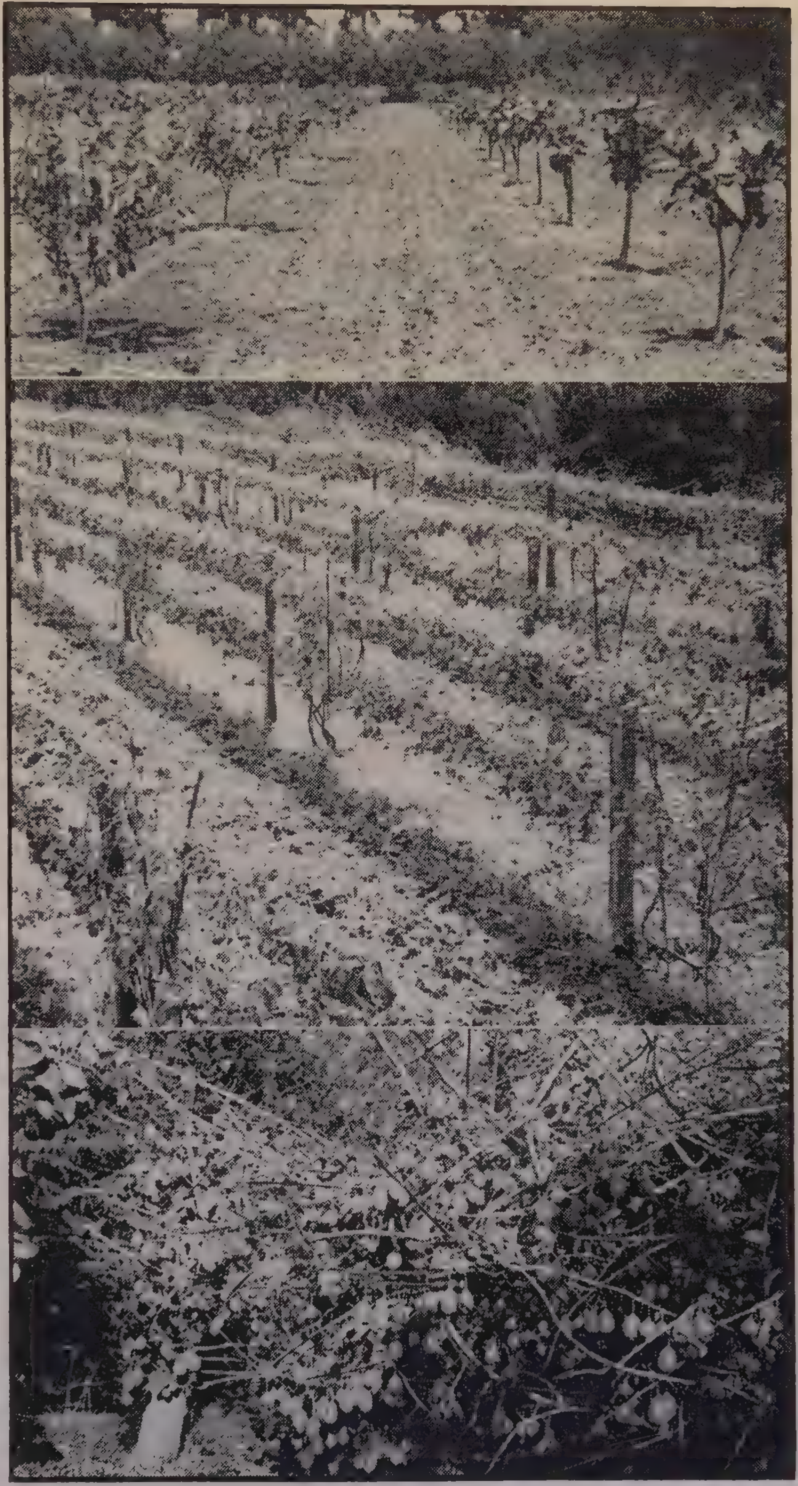
Because very little asparagus is grown commercially near Auckland, some Bay of Plenty growers have established beds in recent years which have given satisfactory yields and proved payable.

Perhaps the most noticeable development has been the increase in the number of glasshouses erected round Tauranga for growing tomato crops. Since 1947 the area under glass has increased from 20,000 sq. ft. to approximately 100,000 sq. ft. No artificial heating has been installed in any of the houses, the district's high average hours of sunshine being relied on to provide the necessary heat. Earlier cropping could be induced by heating the houses, but that has not been favoured because of the high costs of installing equipment. Glasshouse tomato cropping is being carried on successfully by an increasing number of growers. It is not unusual for some crops to average 8lb. of fruit a plant, but that is above the normal yield for the district.

## Flower Growing and Nursery Gardening

Flower growing is carried out to a limited extent by a number of growers who in the main are engaged in other forms of commercial horticulture. A wide range of flowers can be grown, and the soil is particularly suited to the production of those plants which require light loams with free drainage. Bulb growing to produce cut flowers for market is also a payable sideline.

Soil conditions are also suitable for general nursery work such as the raising of ornamental shrubs, hedge plants, and fruit trees. It would seem from present demands that this branch



*[Middle photograph by Rendell's*

Upper—A young citrus orchard interplanted with tree tomatoes, which will be a temporary source of income until the citrus trees start producing. Middle—A commercial block of passion fruit after the vines have been pruned. This fruit grows well. Lower—A well-laden, mature vine of Chinese gooseberries, good crops of which can be produced.

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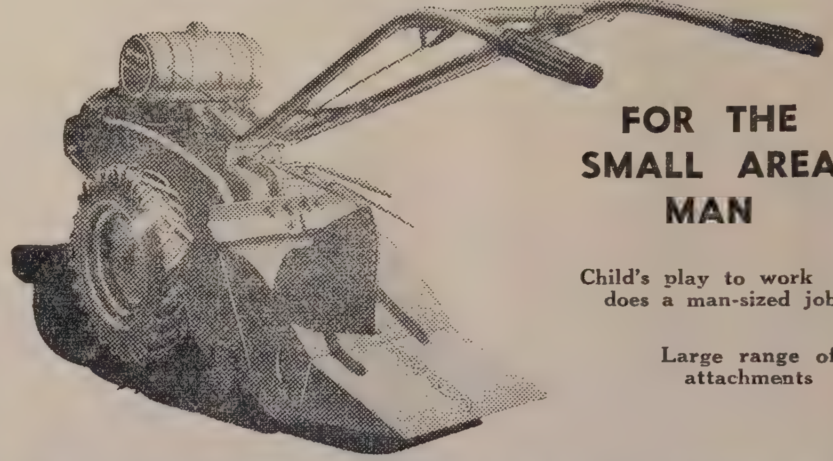

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Packing lemons in a packing house at Tauranga. [*Rendell's*

of horticulture could be increased with a satisfactory margin of profit to the nurseryman. The production of flower and vegetable seedlings could also be increased to a limited extent, as supplies are often insufficient to fulfil local demands.

## Present Land Values

Up to about 1946 horticultural production was mainly centred round Tauranga, but during recent years commercial development has extended over a much wider area. Apart from the fact that Tauranga has attracted many retired people to settle there, the potential industrial development associated with the timber and pulp industries has caused a keen demand for property.

Owing to the rapid expansion of the town the older-established horticultural localities are fast developing into residential areas, and the upsurge in land values and increases in rates are forcing established growers to subdivide their holdings for residential purposes. Current prices paid for small holdings near Tauranga are therefore a matter of what the sellers can get for their properties rather than actual values. It appears in such instances that prices paid in relation to the size of most properties are well beyond an economic level. With the exception of glasshouse units, properties of this kind may meet the requirements of purchasers who do not require a full-time occupation, but they can hardly be considered economic units, as they are established on land that has a residential value.

Any land intended for future horticultural development on an economic scale should be far enough away from the towns to avoid high initial capital outlay and heavy rates. Suitable areas for horticultural production exist near Te Puke and in localities between Tauranga and Waihi, particularly on the many peninsulas extending into the upper reaches of the Tauranga Harbour.

Land available for sale in the areas mentioned is at a premium, but recent sales indicate that present values range from £150 to £300 an acre according to locality. The size of an economic holding depends on what it is intended to produce. For growing fruit and miscellaneous cash crops 8 to 10 acres would be sufficient, but for market gardening a larger area is desirable so that crop rotation may be practised.

## New Enterprise

The possibilities of the Bay of Plenty's ability to produce quantities of vegetables and fruits for quick freezing have been recognised recently. Early in 1952 a company was registered with headquarters in Tauranga to develop a local frozen foods industry, which should prove an asset to fruit and vegetable growers and the district generally. The 1952-53 growing season will be more of an experimental period for the organisation. Contracts were arranged for the growing of several acres of peas and beans in 1952, and small quantities of many kinds of fruit and other vegetables will be processed to test consumer reaction. Should the company expand along the lines expected, much greater quantities of certain kinds of fruit and vegetables than are produced at present will need to be grown to meet its requirements.

## Possibilities for Expansion

With the rapid subdivision near Tauranga of established horticultural areas for building, the development of new holdings to produce a variety of crops is warranted. The area has proved that it is well suited for the growing of citrus and sub-tropical fruits, and at present a limited scope exists for the planting of new orchards with certain varieties of those fruits. Of the citrus fruits, standard lemons, sweet oranges, and mandarins appear to offer the best prospects. New plantings of New Zealand grapefruit and Meyer lemons cannot be advocated, as for some years production of these two varieties seems ample for New Zealand requirements.

Economic problems are being experienced by standard lemon growers, but are not insurmountable, as they are due more to assembling and marketing difficulties than to fruit production difficulties. Of the sub-tropical fruits, new plantings of tree tomatoes and passion fruit appear to offer reasonable prospects. Production of these fruits has declined during the last 2 years owing mainly to the eradication of orchard blocks on land sold for building. Tree tomatoes probably offer the more attractive proposition, as they are easier to grow and production costs are much lower than for passion fruit. However, they must be restricted to localities well protected from winds and it is important that the site be relatively frost free.

Market gardening in conjunction with other forms of horticultural development also offers limited scope. The taking over of market-gardening land near Auckland for building has sent prospective growers further afield. The Bay of Plenty may provide greatly increased quantities of vegetables for the city markets in future, as it has been shown that the area can produce excellent-quality root crops, onions, and asparagus, and with the present road and rail transport facilities produce can be placed on the auction floors in first-class condition.

The expected development of the port at Mt. Maunganui to provide facilities for coastal and export shipping, combined with the potential development of the timber and allied industries in the Bay of Plenty, must in turn increase the demand for locally grown fruit and vegetables. The development of the quick-freeze enterprise should also add to the demand. With a favourable climate and a soil that is easy to work, the Bay of Plenty seems to offer an assured future to many types of horticultural crops. To the man who is physically fit, has some capital, and is prepared to work the production of such crops offers a healthy outdoor occupation besides providing a fair standard of living.

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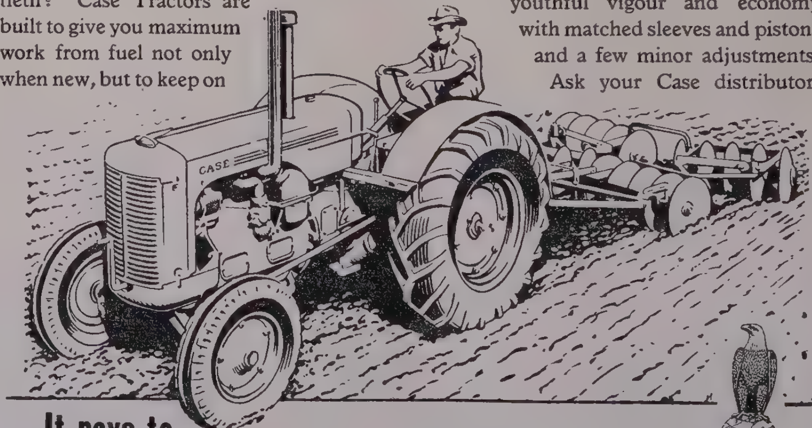

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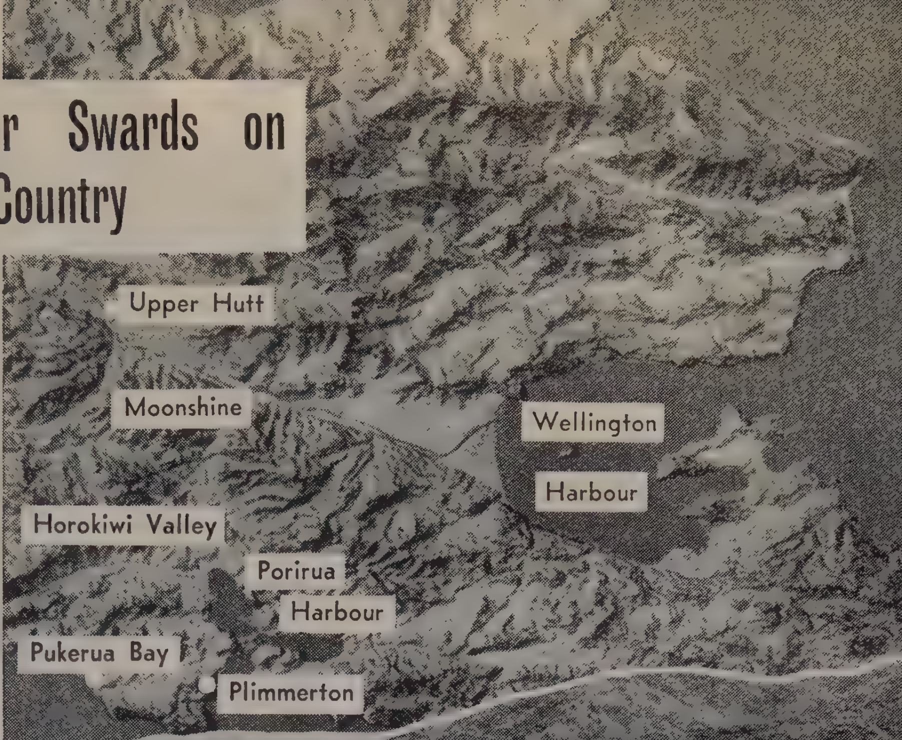
# Improvement of Inferior Swards on Wellington Hill Country

IN the Wellington hill country on both sides of the Pukerua Bay-Plimmerton main highway, on many areas adjoining both basins of the Porirua Harbour, in the lower Horokiwi Valley-Pauatahanui-Judgford area, and on portions of the hill lands of the Moonshine Road from Judgford to Upper Hutt there are considerable areas of terrace, rolling, and semi-steep hill lands which are carrying inferior pasture swards and which are capable of considerable improvement. This article by J. M. Hopkins, Instructor in Agriculture, Department of Agriculture, Levin, refers in particular to methods adopted to improve those inferior swards on farms in the Horokiwi Valley-Pauatahanui-Judgford area and on the Moonshine Road between Judgford and Upper Hutt.



THE practice of cultivating hill lands and bringing them into better pasture is in no way unique. It is, however, of such outstanding success in these districts in changing the low-producing, inferior swards to high-producing types capable of fattening stock that this recording of the methods adopted is considered to be well worth while.

## Pasture Renewal Methods

On the inferior hill swards of this area pasture improvement may take place through oversowing or after a planned cropping programme.

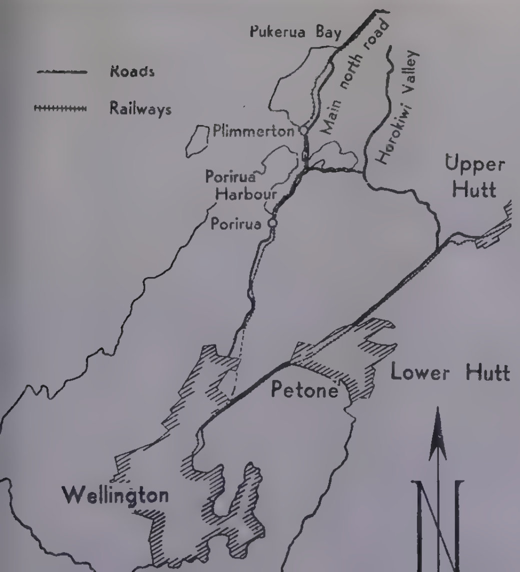
In the former method considerable improvement can be effected by combining an oversowing of subterranean clover or white clover with phosphatic topdressing. The method, however, is much slower than the cropping method. Consequently it should be restricted to steeper areas where cultivation would be too difficult or dangerous.

Under the cropping method the first job is to disc the area with giant discs as soon after winter as the country can be worked, usually early in August. After 6 to 8 weeks, during which weathering action will have broken down much of the rough, disced turf, a further double cut by heavy discs will break down the soil, so that, after harrowing and rolling, a fairly good seed-bed will be ready by late October. If desired, heavy levelling irons may be used to crush clods and assist in levelling the surface before harrowing and rolling.

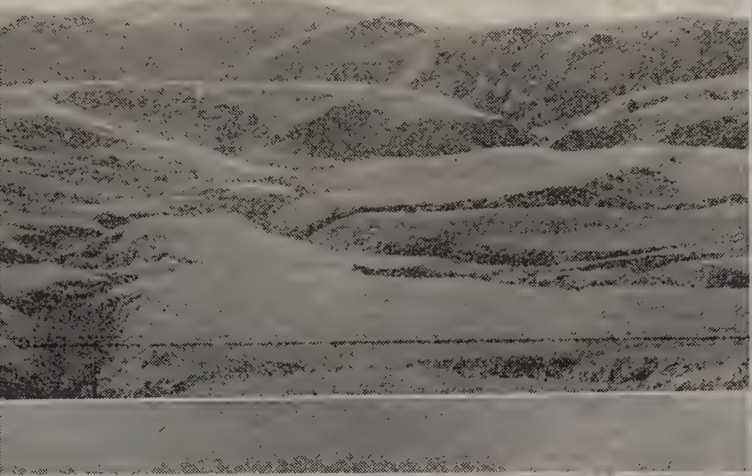
The initial crop on such country is usually swedes or turnips sown for early to later winter feed.

---

ILLUSTRATIONS: The relief map at upper right is from a model by N. T. Goldie. Middle—Part of a gorse-infested hill block in Horokiwi Valley which has been giant disced, worked down, and sown in hard turnips for winter feeding. Lower left—A locality map showing the areas described in the article.



# WELLINGTON HILL PASTURES



Upper left—Rolling country, Pauatahanui basin, showing improved pastures of ryegrass, white clover, and subterranean clover. Upper right—Rolling and semi-steep hill areas near Pauatahanui. The infestation of Scotch thistle in the paddock in the middle distance was typical of many areas in the past wet season. Middle left—Hilltops and slopes which have been cultivated and worked to a seed-bed for the sowing of a grass and clover mixture. Lower left—Rolling hilltops in the Moonshine Road area, considerable portions of which can be improved by cultivation and by topdressing and oversowing with clovers. Lower right—Hill tracks give access to many terrace tops and rolling tops which can be cultivated.

A newly broken-in hill block which has been worked to a seed-bed and sown in hard turnips for winter feeding.

Superlative swedes or Hardy Green Globe turnips are the most popular varieties and are usually sown at 1lb. per acre with 3 to 4cwt. of superphosphate, serpentine superphosphate, or a proprietary mixture.

After these crops are fed off, the land is occasionally returned to grass in spring. This entails a further double discing with tandem discs in August, followed by harrowing and rolling to have the land ready for grass seed sowing by mid-September. More frequently, however, the areas are cropped again before being sown to pasture in autumn.

In such cases the same spring cultivation is given, with the final working down taking place in time to allow the areas to be sown in rape during October. For this purpose Broad Leaf Essex is generally favoured at 3lb. per acre with 3cwt. of equal parts of superphosphate and blood and bone. When this crop is fed off, the land is again double disced in February, harrowed, and rolled, to be ready for grassing by late February or early March.

Farmers appreciate the value of good seedings with high-quality seed, and consequently there is a demand for Certified seed in all grass mixtures. One that is commonly sown is as follows:—

| | lb. per acre |
|---|---|
| Certified perennial ryegrass | 25 |
| Certified short-rotation or Italian ryegrass | 5 |
| Certified white clover | 3 |
| Certified Montgomery red clover | 2 |
| Certified Mt. Barker subterranean clover | 2 |
| Certified cocksfoot | 5 |
| Certified crested dogstail | 2 |
| | 44 |

With this seeds mixture it is customary to sow 3cwt. of superphosphate or serpentine superphosphate. In addition it is found that a further 2 to 2½cwt. per acre, sown in the first spring after establishment, strengthens the clover growth and ensures that the pasture will be a success.

The cropping programme as outlined provides a useful supplementary feed supply.

### Bulletins for the Hill-country Farmer

HILL-COUNTRY farmers will find interesting and useful the Department of Agriculture bulletins listed below. Except where otherwise stated, all the bulletins are free and are available at offices of the Department. The chargeable bulletins are available at main offices only.

| No. | |
|---|---|
| 189 | Control of Internal Parasites by Phenothiazine. |
| 192 | Blowfly Strike in Sheep. |
| 234 | Shearing Machines. |
| 240 | Lime Requirements of Soils. |
| 246 | Shearing, 6d., post free. |
| 249 | Killing Your Own Meat, 6d., post free. |
| 308 | Rearing and Training a Sheep Dog. |
| 316 | Weed Seeds in Agricultural Seed. |
| 325 | Foot-rot in Sheep Can Be Eradicated. |
| 328 | Foot Troubles in Farm Animals. |
| 329 | Chemical Methods of Weed Control. |
| 339 | Developing Marginal Lands, 10s., post free. |
| 348 | Lambing Troubles. |
| 353 | Design and Construction of Sheep-drafting Yards. |

The hard turnips and swedes are particularly valuable in the early stages of transition from poor swards to good pastures, as they supply a much-needed addition to the inadequate winter growth from grass. Consequently the main flock sheep and breeding cattle can be carried over in better condition. Likewise, the second crop, rape, provides a valuable addition to the available summer feed and assists with the fattening of lambs and dry sheep.

In addition to these advantages from cropping, mechanical cultivation of the soil improves its tilth and permits uneven surfaces to be levelled before permanent grassing is done.

Furthermore, the feeding off of all crops raises fertility through the concentration of stock droppings. This is of considerable benefit in the early stages of establishing pasture.

## Management of Improved Areas

Under a system of improvement which involves cropping on relatively small areas the essential fencing into suitably sized fields is often done to provide protection for crops. Consequently further subdivision is not always necessary. However, the value of reducing the sizes of large fields to enable better grazing management to be practised should never be overlooked. At present fencing on hill country is costly both for material and labour, and further subdivision may not appear warranted. The point to remember, however, is that high-producing pastures will remain so only if well managed, and good management is difficult on large fields. Hence subdivision should be provided for in any scheme for pasture renewal and improvement.

There is a tendency to punish improved pastures by overgrazing, especially where the areas are limited in

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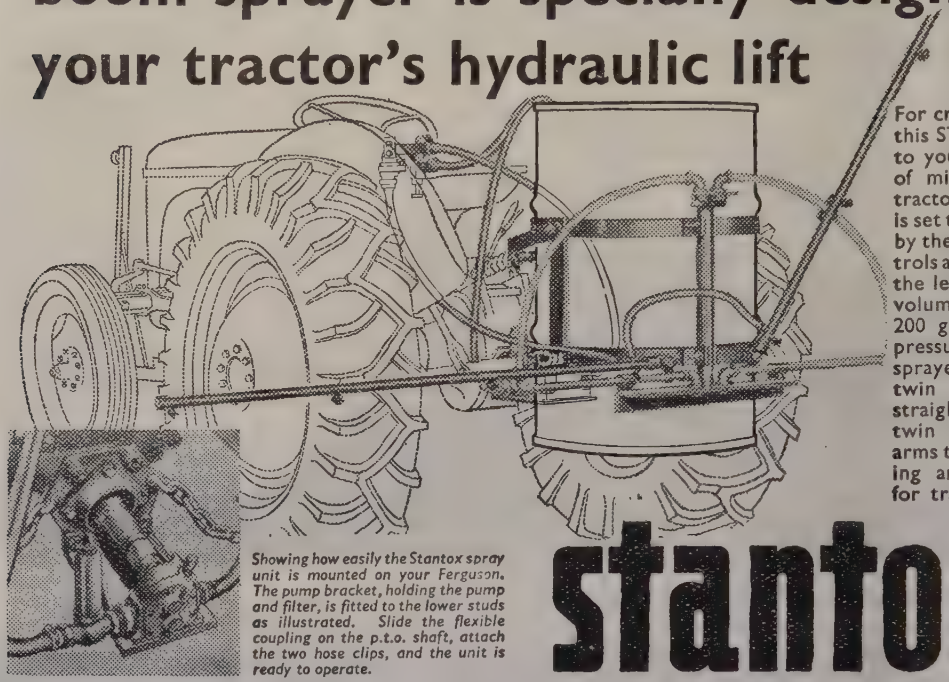

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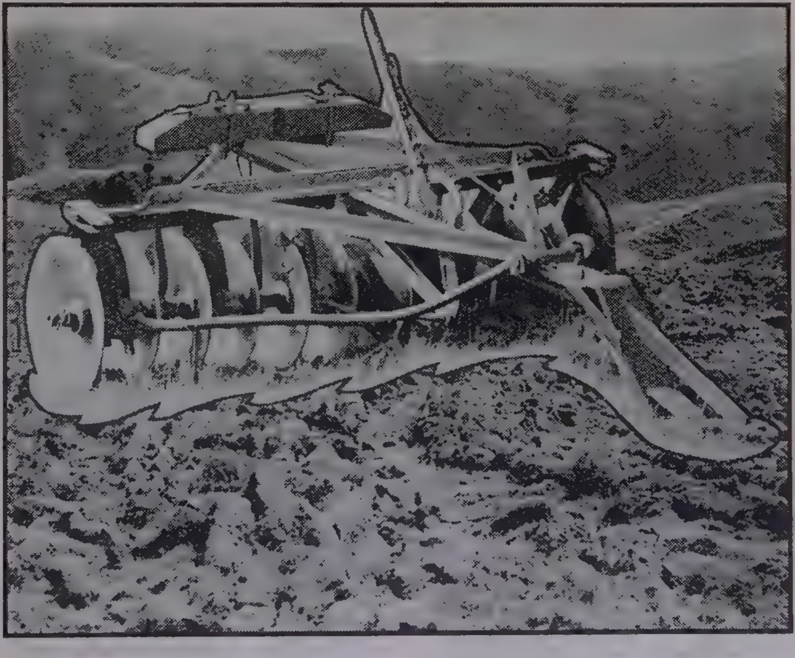
A hill block on the Moonshine Road which has been recultivated after a winter crop of turnips and prepared for the sowing down of pasture.

the early stages of improvement. This must be avoided at all costs, and a well-ordered system of alternating grazing and spelling should be developed in conjunction with the general grazing of the whole farm. This ensures that adequate spells for recovery after grazing will be provided. In addition, all new areas should be topdressed annually. Generally 2 to 3cwt. per acre of phosphate applied in autumn will be adequate, and in practice superphosphate, serpentine superphosphate, and occasionally a proprietary mixture are applied at this rate.

Provided some attention has been paid to levelling and adequate tracking has been provided, a considerable proportion of this annual topdressing can be done by ordinary manure distributors. Where this is impracticable the fertiliser can at least be hauled by tractor to suitable points for hand application. Recently there has been much more attention given to aerial topdressing, and it is expected that much of this country will be topdressed by plane in the near future.

## Effects on Production

Improvement of hill swards is usually reflected in improved quantity and quality of farm products and in a higher carrying capacity. The first noticeable effects come from greater wool and meat production, even



As the land is too steep for ploughing, the initial breaking is done with a heavy, giant disc harrow pulled by a tracklaying tractor, which leaves the land in a rough ploughed state.

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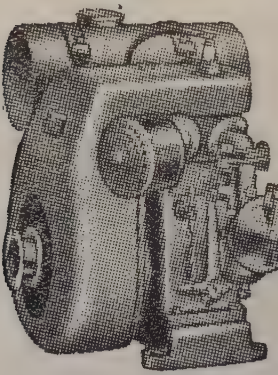

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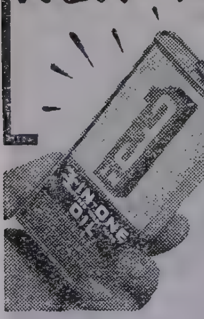

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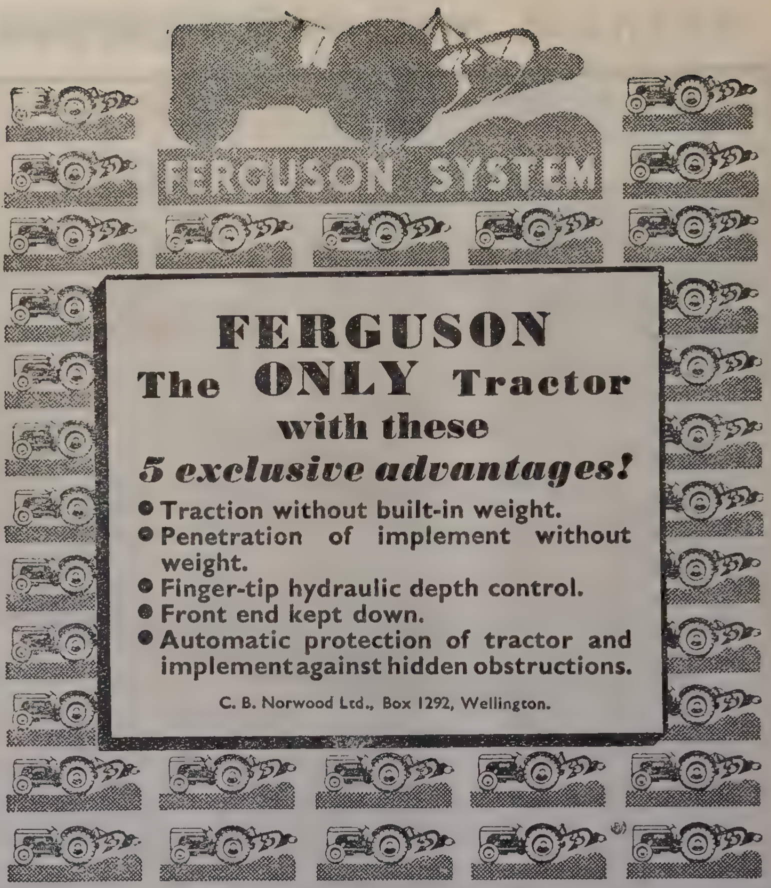

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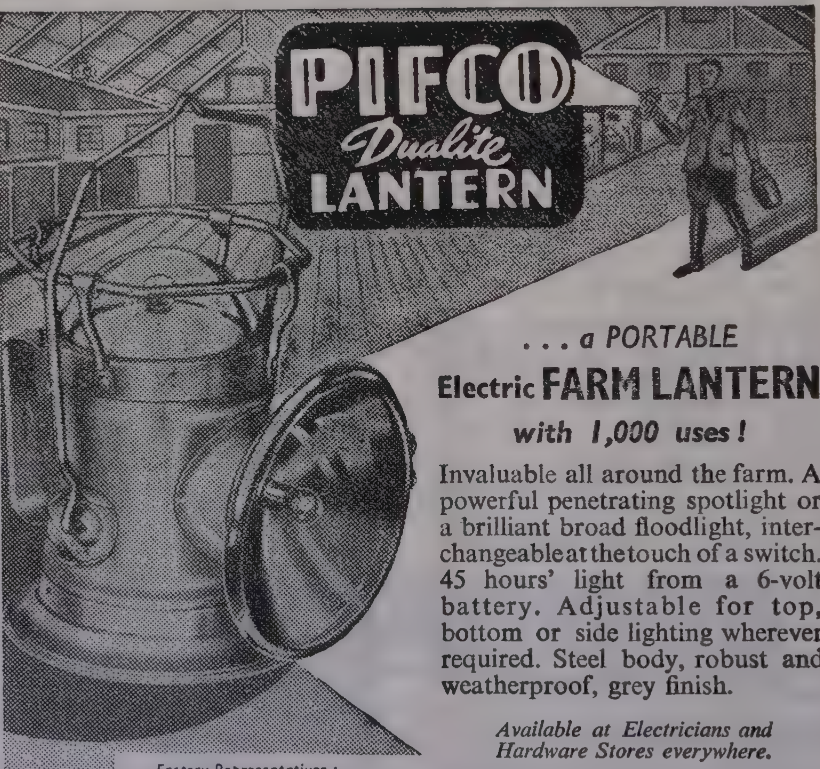

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though the total number of stock carried does not rise immediately. In a relatively short period, however, it is found possible to increase stock numbers as well and still maintain the higher level of production. To illustrate these points the following information concerning farms at Pauatahanui is given.

The first example is a farm of 500 acres of semi-steep hill country which was acquired in 1946. The country was grossly overstocked, consisted mainly of chewings fescue-browntop-danthonia pasture, and had never been topdressed.

The earlier carrying capacity is unknown, but the owner could not carry more than 368 ewes with 325 lambs in 1947. At this time the wool production was 11 bales.

By the end of 1952, 169 acres had been cultivated, cropped, and sown to new pasture and the carrying capacity was then 310 2-tooth ewes, 865 breeding ewes with 869 lambs, and wool production was 30 bales. New grass areas on this farm now carry 3 ewes per acre, whereas the original sward would not do better than one ewe.

Expressed in terms of money the value of one acre's production in 1947, represented by the lamb and wool from one ewe, was £3 8s., but an acre of new grass in 1952 carrying 3 ewes returned £15.

On another area of 280 acres the stock carried before pasture improvement were 330 ewes, 50 ewe hoggets, and no cattle. Today, after regrassing of the area, the winter carrying capacity is 700 ewes, 200 ewe hoggets, and 70 young cattle. Apart from increased numbers, the health and vigour of stock have improved, wool weights are up, and all surplus lambs are fattened off their mothers.

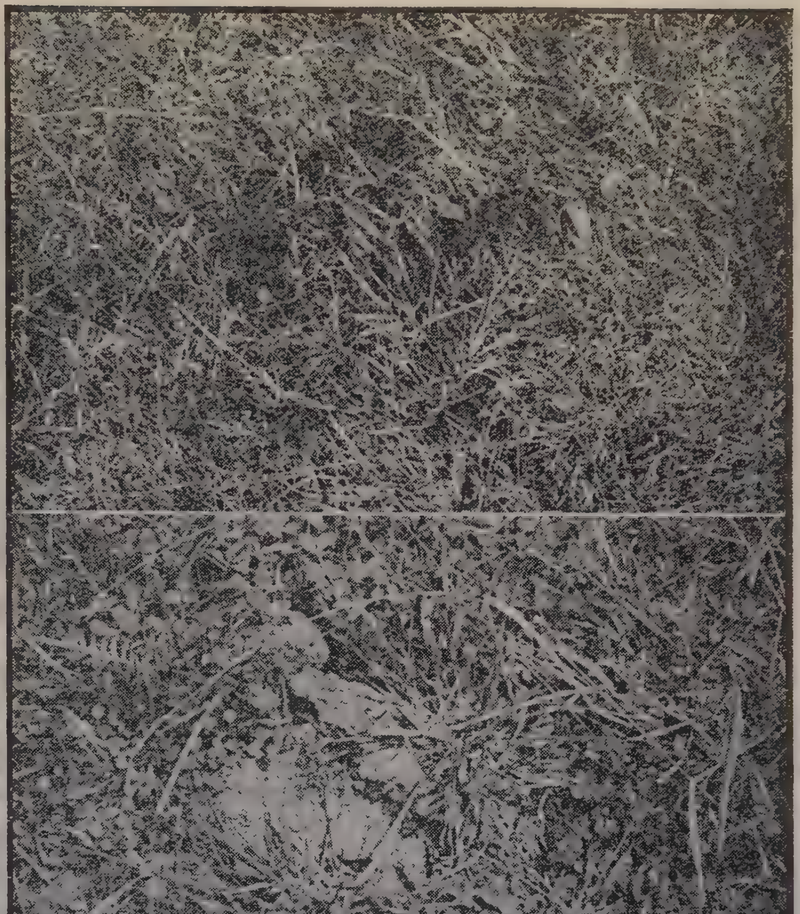
On a third farm, recently acquired, one field has been cropped and regrassed, and the carrying capacity has risen from 1 ewe to 4 ewes per acre.

Many similar instances could be cited, but these will serve to confirm the striking influence such pasture improvement can have on farm production.

## Considerable Improvement Possible

In Hutt and Makara Counties the extent of country which could be improved by these methods is considerable. In the past most of such work has taken place on the easier terraces and rolling country, but, with the provision of better tracks to the higher country, operations are now expanding on to this land. Aerial application of fertiliser and seed will play an increasingly important part in the further development and maintenance of such country—factors which will lead to greater increases in flocks and herds with resulting improvement in production of wool and meat, as well as breeding stock for the lowlands. Higher production from farmlands is an urgent requirement, and this can be accomplished in a big way by concentration on the development of hill country.

In the Wellington district alone the application of approved methods of development to hill country could have a striking effect on production, an effect that could be multiplied many times if extended generally to the hill country of all districts in the North Island.



Upper—Typical sward of untopdressed Wellington hill country which is low producing and has a long dormant period in the cold part of the year. Middle—Sward on hill country which is low producing, but which shows a natural increase of white clover in and around cattle droppings. Lower—Four-year-old pasture sown after cultivation on hill country. Pasture species are dominantly perennial ryegrass and white clover.

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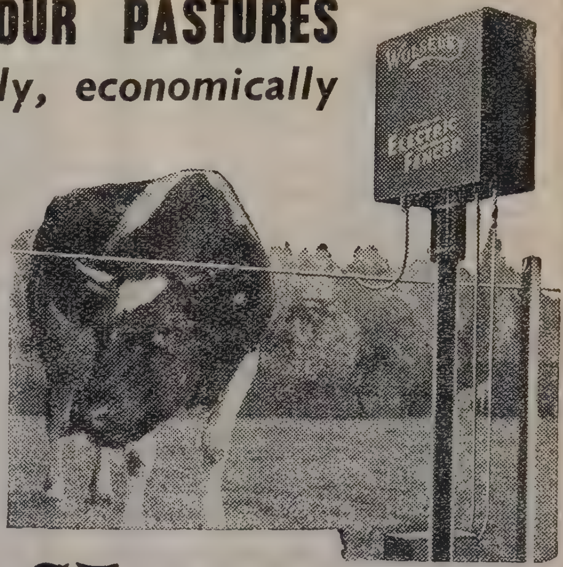

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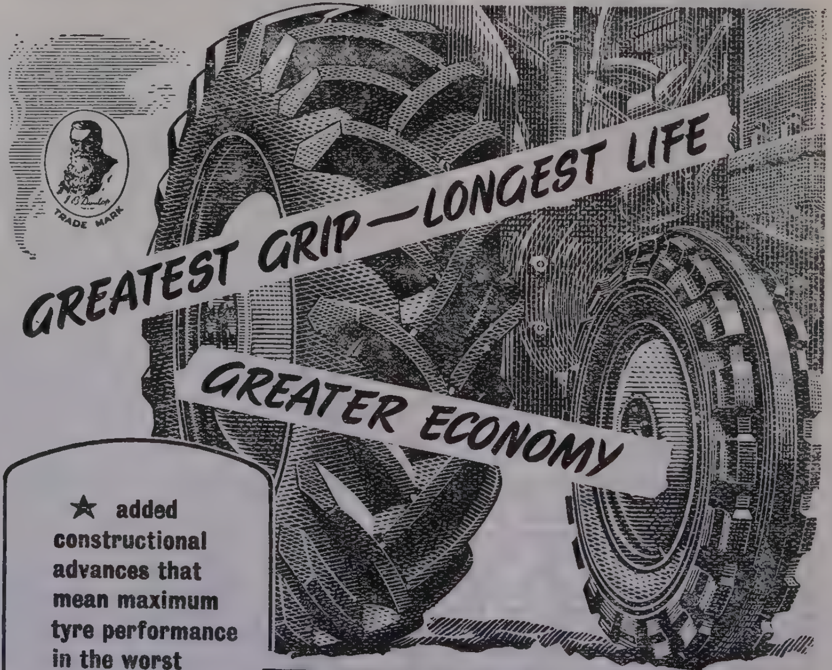

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# Built-up Litter for Poultry Houses

LITTER in poultry houses is important and is put in for two main reasons—to act as a sponge or absorbent for collecting surplus moisture and the birds' droppings (a safety measure), and to provide warmth and exercise for the birds. These reasons apply equally to small flocks or large flocks, and when the birds are running out on free range, in runs, or are housed intensively. The warmth in correctly handled litter can be felt with the hand. It can be responsible for some of the difference between good winter egg production and mediocre production. In this article S. G. Haddon, Poultry Instructor, Department of Agriculture, Auckland, describes management methods for the use of built-up litter.

THERE is nothing particularly new in the idea or practice of built-up litter. It has, however, been given considerable publicity in New Zealand and overseas in recent years. Commercial poultry men who have been established for years have made a practice of giving their laying sheds a thorough yearly clean out. Between cleanings the litter has been allowed to build up by the accretion of the birds' droppings. Provided it stayed reasonably dry and loose, no special care has been taken. This litter is built-up, but it is very different from the original straw or shavings.

The recent litter publicity started in America, where certain poultry farmers, faced by an acute labour shortage, neglected to clean out their sheds, clean litter being placed on top of old litter. Contrary to general expectation and expert advice, flock health remained good and production was excellent.

The problem was handed over to state experimental stations, which have since done an enormous amount of work in controlled experiments, with interesting and sometimes contradictory results. Meanwhile many claims were made for built-up litter—it was labour saving, it was hygienic, it possessed disinfecting properties, it could check coccidiosis, it was fatal to disease organisms, and it boosted egg production.

## Birds Thrive on Built-up Litter

It is now fairly certain that adult birds will thrive on old built-up litter provided certain management practices are used. It must first be emphasised that built-up litter is not an excuse or remedy for bad or slovenly management, and any farmer who believes that he can use deep litter and then neglect his flock may expect trouble.

The building up of litter is begun gradually by placing 4 to 6in. of straw, sawdust, shavings, or similar material in the pen. As this becomes broken down and absorbs droppings and moisture from the birds a composting action occurs.

**Because of the importance of this composting the making of deep litter should be begun in the warm period of the year, never in autumn and winter.**

Once this composting has started fresh litter may be added in small quantities. Common sense must dictate the rate at which new litter can be incorporated into the old. As an illustration, 50 pullets in an Auckland backyard intensive house composted down 4 bales of straw and 2 sacks of wood shavings in 18 months. The litter was originally about 3in. deep and was 9 to 10in. deep at the end of the first laying year, though many barrow loads were removed for topdressing a garden.

## Litter Must be Loose

Once a good depth of loose, freely working litter is attained, every effort must be made to keep the litter from packing or solidifying, particularly around drinkers or under perches which have no droppings boards or pits. This may mean shaking the litter over with a fork occasionally, but the feeding of daily scratch grain will greatly assist in keeping the litter loose. Persistent over-all dampness can be treated by improving the ventilation of the shed, by reducing the number of birds in the pen, or by sprinkling agricultural or hydrated or burnt shell lime at about 1lb. to each 10 sq. ft. The last-mentioned treatment should not need doing more than once or twice during winter.

As the litter becomes deeper through the accretion of droppings, some of it may be removed for gardens or for selling and new litter added. In this way there is a constant circulation of new litter being broken down to composted litter.

## Composting Action Important

The composting action in old litter is stressed, because it is important. The American experiments established that old litter contained an unknown factor labelled animal protein factor (A.P.F.). This factor the Americans found was mainly responsible for the good health

HEADING PHOTOGRAPH: Type of intensive laying house in which deep litter could be used with advantage.

and good production of flocks kept on old, built-up litter. The A.P.F. was recognised as being present in meat and fish meal proteins, but not much was known about it beyond its extremely beneficial effect and the fact that it was essential for health and production. Further work on the A.P.F. isolated a new member of the complex vitamin B group and it was labelled B12. Later other workers proved conclusively that B12 could be synthesised by micro-organisms in the presence of trace amounts of cobalt, and named cow manure as being a prolific source of B12. Now it is known that built-up litter in good order is a good source of vitamin B12. However, the presence of this vitamin depends solely on the composting action taking place.

### Shed Cleaning Procedure

The question will arise as to what happens at the end of the year, when normally all the litter is removed from the sheds for the annual clean up. A method used successfully by many poultry farmers is to remove about half the litter, leaving the free-running dry portions, which are heaped at one end of the shed and covered with sacks or a tarpaulin while the shed is cleaned. The heap of old litter is then shifted on to the cleaned portion of the shed and the house cleaning is completed. The old litter is then spread, new litter is added on top, and the house is ready for the new flock of birds.

There are exceptions to this procedure. If during the year the pen suffers an outbreak of a virus disease such as fowl pox or an outbreak of bacterial infection such as infectious coryza, all the litter must be discarded and no portion kept for a second season. Old, non-infected litter from another shed could be used to start off the built-up litter.

### Method for Chick Rearing

Some farmers in this country and overseas have endeavoured to apply the built-up litter principle to chick rearing. It has been applied successfully to at least one Auckland farm for over 3 years. The layout of this farm and the rearing programme (about 2000 day-old chicks each season) called for a steady flow of chicks into one end of a brooder shed, each brood being moved along one stage weekly. Previously each little pen was cleaned between moves and all chicks irrespective of age went on to clean litter each week. Now each batch goes on to clean litter, beneath which is the best of the last batch's litter. This means in effect that at no time are any chicks on litter which has been used by chicks or birds which were more than 1 week older than themselves, though the litter may contain some litter which is over 3 years old. This seems to be the secret of the successful working of the deep litter system applied to chicks.

It is dangerous and not recommended to attempt the rearing of chicks or young stock on litter, however good and dry it may be, which has been used by adult stock. Old litter from young birds should be used for young birds and old litter from adults for adults.

Built-up litter and its relation to disease, particularly coccidiosis, has stimulated a lot of thought. Some workers consider that under this system flocks appear to acquire a degree of immunity against coccidiosis, and other workers claim that built-up litter carries a very high count of the organisms.

However, flock treatment against this disease is practicable and efficient. No outbreak of disease in this country has been traced to the use of deep or built-up litter, and there is every indication that flocks on built-up litter where the housing, feeding, and overall management are satisfactory are giving results equally as good as those obtained from the older, more orthodox systems of litter management.

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## Book Review

## "Arable Farm Crops of New Zealand": J. W. Hadfield

STUDENTS of agriculture of a generation ago used as their guide Connell and Hadfield's "Agriculture". That book is still a standard work in New Zealand, but students of this generation are able to add to their list of text books "Arable Farm Crops of New Zealand", by a co-author of that earlier publication, Mr. J. W. Hadfield, until recently Director of the Agronomy (now Crop Research) Division of the Department of Scientific and Industrial Research.

The first book from the pens of the co-authors, written when they were at the thresholds of their careers, has admirably filled a place in the study of agriculture by many students. Since then Mr. Hadfield has made a close study of all phases of arable crops in New Zealand, particularly the improvement in the varieties and strains available to the farmer. Now at his retirement some of the knowledge he has accumulated has been committed to paper for the benefit of future students.

Mr. Hadfield has been generous in his acknowledgment of the assistance he has received from others in the preparation of his book, and claims only to have collected information from various sources. But all of those whose assistance he has acknowledged have at some time or another broadened and deepened their knowledge from their association with him, most of them through the privilege of working under his guidance and direction. Perhaps more than he realised is he therefore justified in the statement "the text is mine, and I alone am responsible for whatever mistakes may appear therein."

"Arable Farm Crops of New Zealand" is not an alternative to or a replacement of "Agriculture". Rather is it the "second round", leading the student to a more advanced stage of his subject and providing for him a degree of specialisation in his study. The book is primarily for students, but that does not confine its use to universities and colleges. Every farmer worthy of the name is a student, and even as the farmer of a generation ago found much of value and interest to him in "Agriculture" so his sons today after a generation's advancement in agricultural knowledge can find much of value and interest in "Arable Farm Crops of New Zealand".

The book contains sections on all the arable farm crops grown in New Zealand. Each crop is dealt with in its own chapter, which includes information ranging from the history of the species to the present importance of the crop in New Zealand, from production statistics to methods of utilisation, from cultural methods to varieties, and from growing requirements to diseases and insect pests. And if the study of the book itself is not sufficient to satisfy the thirst for knowledge of the more diligent, a list of references to overseas and New Zealand writings related to each chapter points the way to further study.

If there is any criticism of the publication, it can only be at the attempt by the author to cover such a vast field in just over 300 pages. But the field has been covered, and in such a way as to provide concisely the greatest information to the reader and to reflect the breadth of knowledge of the author.

"Arable Farm Crops of New Zealand" is well written and still further improved by excellent illustrations and good printing.

—*J.H.C.*

**New Zealand Department of Scientific and Industrial Research. 28s. 6d.**

# Construction and Planting of Wall Gardens

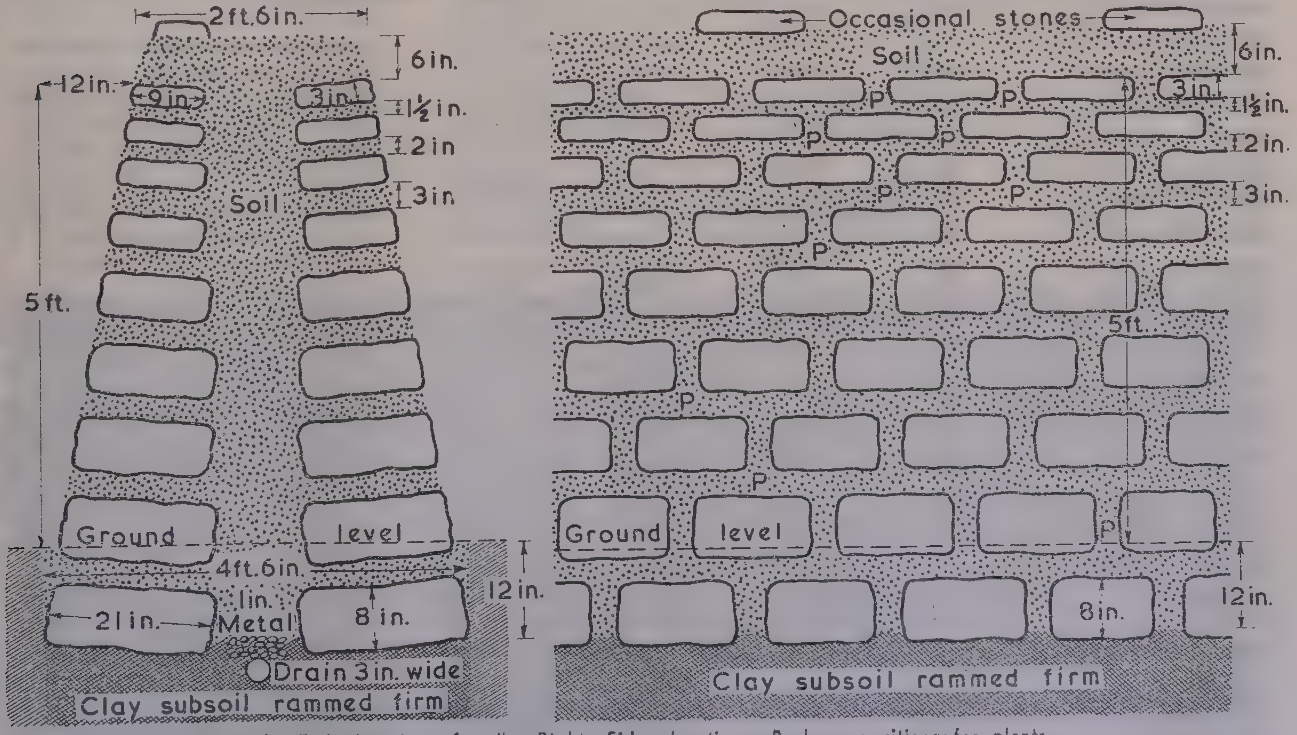
CORRECT construction of wall gardens should be given serious thought. Faulty methods may lead to disappointments such as an early breakdown of walls or the failure of choice plants to grow. Although stone is the traditional material for wall gardens, other materials such as bricks or concrete when treated in an imaginative way to give wall strength and yet meet the needs of plants can give a satisfying and delightful result. Some helpful suggestions for garden wall construction and an extensive list of suitable plants for display are given in this article by G. J. Hicks, Horticultural Inspector, Department of Agriculture, Christchurch. Garden work for September is dealt with by H. P. Thomas, Horticultural Instructor, Department of Agriculture, Wanganui.

THE wall garden or dry wall as it is often called may have several purposes. It usually consists of a continuous and usually vertical solid structure of stone bonded with soil, narrow in proportion to length and height, serving partly to enclose and protect or divide off a section of a garden, and offering a congenial site for a large group of rock garden plants. The most common dry walls seen in gardens on hills are retaining walls facing earth banks or for building terraces. Where stone is plentiful it is used sometimes instead of hedges and paling fences to provide shelter and divide the property.

Stone holds a favoured place as a building material. It may be quarried limestone, sandstone, granite, or volcanic rock, but most gardeners recommend the use of stone found in the district, as it is usually less costly

[V. C. Browne

A stone retaining wall with each stone fitted with its neighbour. A good feature is the large stones at the base and the smaller ones at the top. The interstices between the stones prevent the build-up of pressure of the weight of moisture and sodden soil in wet weather. If this wall were to be used for growing plants, the stones would be better trimmed and built horizontally, 1 to 3in. of soil placed between them, and the stones bonded. Drainage behind, through, and at the foot of the wall is also required and is essential in wet districts. Coverage of the wall as it is would best be achieved by insertion of trailing plants at the top and small shrubs and climbers at the base; in 2 or 3 years very little of the wall would be visible.



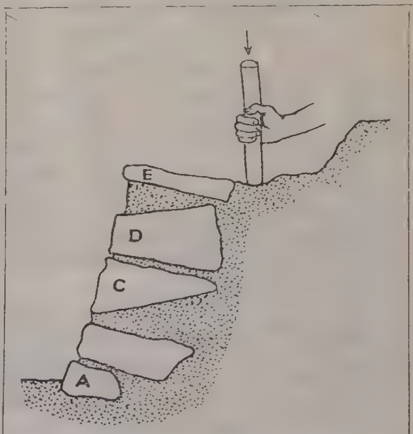
Left—End elevation of wall. Right—Side elevation. P shows positions for plants.

## Plants Suitable for Wall Garden. (Those Suitable for Sowing as Seed in Pockets are marked with an Asterisk)

| _Name_ | _Height or habit_ | _Colour_ | _Attractive period_ | _Position on wall_ |
|---|---|---|---|---|
| _Acaena buchanani_ .. .. | Trailer | Yellowish red spines | Jan.-March | Top or face |
| _Acaena microphylla_ .. .. | Trailer | Bright red spines | Jan.-March | Top or face |
| _Achillea argentea_ .. .. | 3-4in. | White flower | Oct.-Dec. | Top or face |
| _Achillea tomentosa_ .. .. | 6-9in. | Yellow flower | Nov.-Jan. | Top or face |
| _Aethionema grandiflorum_ .. | 12in. | Pink flower | Nov.-Jan. | Top or face |
| _Aethionema_ var. Warley Rose | 9in. | Carmine rose | Oct.-Nov. | Top or face |
| _Alyssum alpestre_ .. .. | 4in. | Yellow | Nov.-Feb. | Top or face |
| *_Alyssum maritimum_ .. .. | 4-6in. | White | Oct.-May | Top or face |
| *_Alyssum maritimum_ var. Violet Queen .. .. .. | 4-6in. | Mauve | Oct.-May | Top or face |
| _Alyssum saxatile_ .. .. | 9-12in. | Yellow | Oct.-Nov. | Top or face |
| _Androsace sarmentosa_ .. | 4in. | Rose with white eye | Oct.-Dec. | Top or face |
| _Antirrhinum majus_ .. .. | 24in. | Various | Summer and autumn | Top or face |
| _Aquilegia alpina_ .. .. | 10in. | Violet and blue | Nov.-Dec. | Top or face |
| *_Arabis albida_ .. .. | Trailer | White | Oct.-Dec. | Top or face |
| _Arabis androsacea_ .. .. | Trailer | Rose | Oct.-Nov. | Top or face |
| _Armeria caespitosa_ .. .. | 4in. | Pinky lilac | Nov.-Dec. | Top or face |
| _Armeria maritima_ .. .. | 6-8in. | Rose, red, lilac | Nov.-Dec. | Top or face |
| Aubrietia various .. .. | 3-4in. | Red, white, blue, and mauve | Sept.-Nov. | Face |
| _Campanula caespitosa_ .. | 6in. | Blue | Summer | Face |
| _Campanula fragilis_ .. .. | 6in. | Blue | Summer | Face |
| _Campanula garganica_ .. | 9in. | Mauve, white, pale blue | Summer | Top and face |
| _Campanula rotundifolia_ .. | 12in. | Blue | Summer | Top and face |
| _Campanula rotundifolia alba_ . | 9in. | White | Summer | Top and face |
| _Celmesia incana_ .. .. | 12in. | White | Nov.-Dec. | Top and face |
| _Celmesia nova zealandica_ .. | 9in. | White | Nov.-Dec. | Top and face |
| *_Centranthus ruber_ .. .. | 18in. | Red | Nov.-Feb. | Top and face |
| *_Centranthus ruber albus_ .. | 18in. | White | Nov.-Feb. | Top and face |
| *_Cheiranthus allioni_ .. .. | 12in. | Orange yellow | Sept.-Dec. | Top and face |
| _Cheiranthus alpinus_ .. .. | 6in. | Pale yellow | Sept.-Dec. | Top and face |
| _Cheiranthus kewensis_ .. | 12in. | Chestnut | Sept.-Dec. | Top and face |
| *_Cheiranthus_ (wallflower) .. | 12-18in. | Various | Sept.-Nov. | Top and face |
| _Cotoneaster microphylla_ .. | 3-4ft. | White flower, red berries | All the year (shrub) | Top and face |
| _Corydalis lutea_ .. .. | 6-12in. | Yellow | Nov.-March | Shade |
| _Corylopsis pauciflora_ .. | 24in. | Pale yellow | Aug.-Sept. (shrub) | Shade |
| _Cotyledon glanca_ .. .. | 6in. | Scarlet tipped yellow | Nov.-Jan. | Sunny face or top |
| _Cotyledon retusa_ .. .. | 18in. | Yellow | Nov.-Dec. | Sunny face or top |
| _Cotyledon retusa florabunda_ .. | 18in. | Orange red | Nov.-Dec. | Sunny face or top |
| _Cotyledon secunda_ .. .. | 12in. | Reddish yellow | Nov.-Dec. | Sunny face or top |
| *_Dianthus alpinus_ .. .. | 6in. | Rose | Nov.-March | Sunny face or top |
| _Dianthus deltoides_ .. .. | 6in. | Pink | Nov.-March | Sunny face or top |
| _Dianthus plumarius_ .. .. | 12in. | Purple | Nov.-March | Sunny face or top |
| _Epacris pauciflora_ .. .. | 3ft. | White flower in spring | All the year (shrub) | Face, sun or semishade |
| _Epiphyllum truncatum_ .. | 12in. | Rose, white, scarlet, purple | Summer | Sunny face |
| _Erigeron alpinus_ .. .. | 10in. | Purple | Jan. | Face or top |
| *_Erinus alpinus_ .. .. | 4in. | Lilac, rose, or white | Oct.-Jan. | Shade face |
| _Erodium macradenum_ .. | 6in. | White tinged, rose blotched violet | Dec.-Jan. | Sunny face |
| _Fuchsia procumbens_ .. .. | Trailer | Yellow green flowers Red berries | Nov.-June | Face |
| _Fuchsia macrostema_ .. .. | 2-3ft. | Various | Nov.-May | Face or top |
| _Grevillea obtusifolia_ .. .. | 18in. | Red | All the year | Top |
| _Gypsophila paniculata_ .. | 2-3ft. | White | Nov.-Jan. | Face or top |
| _Gypsophila prostrata_ .. .. | 4in. | White | Summer | Face |
| _Gypsophila repens_ .. .. | 3in. | Pink or white | Summer | Face |
| _Hebe hulkeana_ .. .. | 1-3ft. | Lilac | Nov.-Dec. (shrub) | Face or top |
| _Hebe pimeleoides_ .. .. | 12in. | Deep purple | Nov.-Jan. (shrub) | Face or top |
| _Hebe diosmaefolia_ .. .. | 24in. | White | Nov.-Dec. | Face or top |
| _Hebe pinguifolia_ .. .. | 24in. | White | Nov.-Dec. (shrub) | Face or top |
| _Hebe macrantha_ .. .. | 24in. | White | Nov.-Dec. (shrub) | Face or top |
| _Helianthemum_ various .. | 12in. | Various | Nov.-Jan. | Face and top |
| _Helichrysum bellidioides_ .. | 6in. | White | Summer | Face |
| _Hydrangea petiolaris_ .. | Clinger | White | Nov.-May | Shade |
| _Hypericum repens_ .. .. | Creeping | Yellow | Dec.-April | Face or top |
| _Iberis sempervirens_ .. .. | 6in. | White | Spring | Face or shade |
| _Leontopodium alpinum_ .. | 6in. | Yellow | Nov.-Feb. | Face |
| _Lewisia rediviva_ .. .. | 6in. | Pink and white | Oct.-Feb. | Face |
| _Liatris spicata_ .. .. | 20in. | Mauve | Feb.-April | Face |
| *_Linaria alpina_ .. .. | 3-6in. | Violet blotched orange | Nov.-April | Face and top |
| _Linaria cymbalaria_ .. .. | Trailer | Mauve and orange | Nov.-April | Face and top |
| _Linum alpinum_ .. .. | 6-9in. | Blue | Oct.-Dec. | Face and top |
| _Linum monogynum_ .. .. | 6-15in. | White | Oct.-Jan. | Face or top |
| _Lonicera sempervirens_ .. | Climber | Orange scarlet | Summer | Face or top |
| _Lychnis alpina_ .. .. | 6in. | Rose | Sept.-Nov. | Face or top |
| _Lychnis coronaria_ .. .. | 18in. | Red | Nov.-Dec. | Face or top |
| _Lychnis fulgens_ .. .. | 12in. | Salmon | Nov.-Dec. | Face or top |

and harmony of rock colour is achieved easily with the natural outcrops. Water-worn stone may be used, but this is more difficult to use in building and perhaps may be less attractive. Today, however, many people are using concrete blocks, bricks, or concrete to harmonise with the materials used in the construction of the residence. The concrete material may be plastered in a colour to blend with the garden design.

The wall garden is constructed usually with stone from about 2 to 8in. thick of any desired size, rectangular, and more or less untrimmed. Stone is better than most artificial blocks or bricks, as it is less porous and permits a cool root run. Larger stones are used at the base of the wall and smaller ones are used in gradation. In the building of a wall a trench 12 to 18in. deep and about 4½ft. wide should first be opened and the subsoil rammed firm before the first stone is laid. To ensure good drainage it may be necessary to lay a pipe drain in the centre of the trench 3in. below the base level of the stone and covered over with 2 or 3in. of washed metal. (See diagram at left on page 171.) This prevents the soil working into the drains.



Several mistakes are shown in this wall. Largest stones should be at the bottom. Small stones (A) make poor foundations; C, resting on face sloping outward, will tend to slide downward and outward when the soil is very wet. The soil between D and E will tend to squeeze out of the wall, as the upper face of D slopes outward, leaving E and stones above ill supported.

In laying the large stones for the base of the wall care must be taken that the bottom surface is sitting firmly, with the upper surface of the stone slightly higher toward the outside of the wall to set the tilt of the stones above. This slope encourages water to flow into the wall to supply moisture to the plants and adds strength to the structure. The gaps behind the stones of the first layer are packed with soil and a packed layer of 1 to 3in. of soil is laid on top before placing of the next layer of stones, which are bonded, that is, laid in layers so that the lateral extremity of a stone lies over the centres of the two stones in the row immediately below it as in diagram at right on page 171.

Suitable soil for packing consists of 1 part by bulk each of coarse sand; leaf-mould, compost, or animal manure; and loam. The leaf-mould, compost, or animal manure serves primarily to conserve moisture. The loam provides food, and the coarse sand drainage.

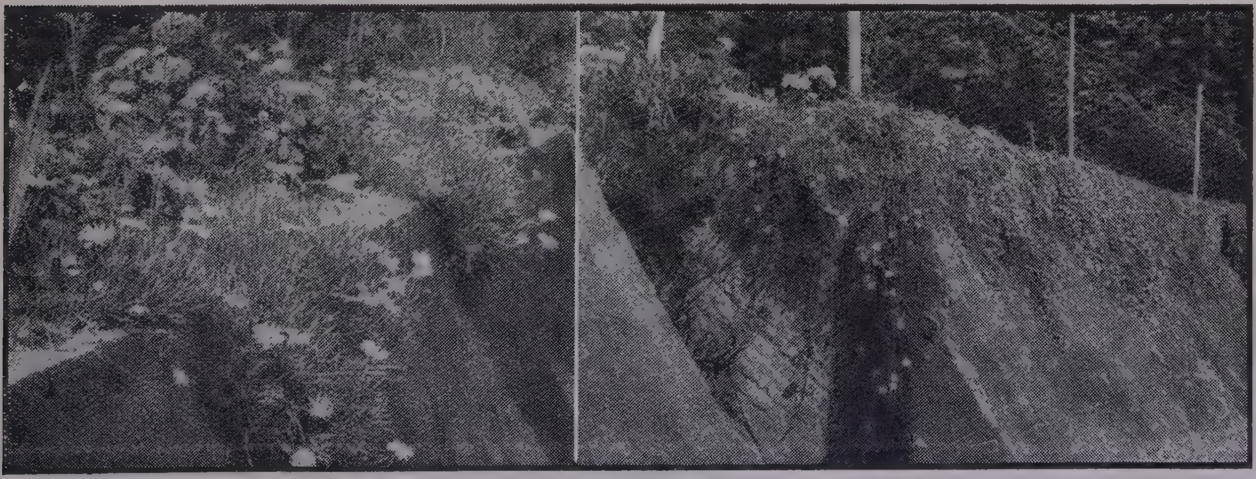
Where a dry wall is used to face a bank or terrace on a hill the use of 1in. metal or rubble between the soil of the wall and the clay bank will allow water from higher ground to soak away fairly rapidly without affecting the wall. Tile drains may be needed at the base of the bank as well as at suitable distances in the face of the wall to ensure adequate drainage.

The main causes of collapse of dry walls are lack of a firm foundation, inadequate attention to drainage, and unsuitable and incorrect placing of stones.

Many people have concrete retaining walls for terraces on hill gardens. To facilitate planting, large holes or an extra number of drain holes should be put into the wall. At appropriate distances certain of these holes may be filled with compost, but care should be taken that drainage is not impeded. This method permits the face of the wall being satisfactorily planted. Omission of these planting holes limits planting to the bottom and top of the wall. When the wall is rather high, say 8 to 12ft., the advantage of planting holes can be readily seen.

## Plants Suitable for Wall Garden, *Cont.* (Those Suitable for Sowing as Seed in Pockets are marked with Asterisk)

| *Name* | *Height or habit* | *Colour* | *Attractive period* | *Position on wall* |
|---|---|---|---|---|
| *Mertensia primuloides* .. | 9in. | Deep blue and red, pink, yellow, white | Nov.-Feb. | Face or top |
| *Morisia hypogoea* .. .. | 4in. | Yellow | Summer | Face |
| *Nepeta mussini* .. .. | 12in. | Blue, mauve | Nov.-May | Face or top |
| *Oenothera acaulis* .. .. | 10in. | White tinted rose | Nov.-April | Face or top |
| *Oenothera missouriensis* .. | Trailer | Yellow | Nov.-April | Face or top |
| *Olearia chathamica* .. .. | 24in. | Mauve or white | Nov.-Jan. | Face |
| *Olearia gunniana* var. blue gem .. .. .. | 36in. | Blue | Spring | Face or top |
| *Pachystegia insignis* ..<br>*Pachystegia insignis* var. *minor* .. .. | 12-18in. | White | Nov.-Dec. | Face or top |
| Pelargonium various .. | 12-18in. | Reds, pink, white | Oct.-May | Face or top |
| *Pentstemon menziesi* .. .. | 18in. | Purple and red | Dec.-April | Face or top |
| *Pentstemon scouleri* .. .. | 18in. | Purple | Dec.-April | Face or top |
| *Phlox amoena* .. .. | 4in. | Bright purple | Nov.-Jan. | Face or top |
| *Phlox subulata* .. .. | 4in. | Various | Nov.-Jan. | Face or top |
| *Polygonum vaccinifolium* .. | Trailer | Rose | Dec.-Jan. | Face |
| *Polypodium vulgare* .. .. | 12in. | Fern | Oct.-April | Face |
| *Primula allioni* .. .. | 4in. | Red | Sept.-Nov. | Shady face |
| *Primula auricula* .. .. | 6in. | Various | Sept.-Nov. | Shady face |
| *Primula clarki* . .. .. | 4in. | Pink | Sept.-Nov. | Shady face |
| *Primula denticulata* .. .. | 12-18in. | Lilac and white | Sept.-Nov. | Shady face |
| *Primula marginata* .. .. | 6in. | Lavender blue | Sept.-Nov. | Shady face |
| *Primula viscosa* .. .. | 4in. | Purple | Sept.-Oct. | Shady face |
| *Ramonda pyrenaica* .. .. | 6in. | Purple | Oct.-Jan. | Shady face |
| *Rosmarinus officinalis prostrata* | Trailer | Blue | Sept.-Nov. | Face or top |
| *Santolina incana* .. .. | 12in. | Yellow | Summer | Face or top |
| **Saponaria caespitosa* .. .. | 4in. | Rosy pink | Nov.-March | Face or top |
| *Saponaria ocymoides* .. .. | 6in. | Rosy pink | Nov.-March | Face or top |
| *Saponaria ocymoides alba* .. | 6in. | White | Nov.-March | Face |
| *Saxifraga aizoon* and vars. | 6-10in. | Cream rose, and yellow | Oct.-Jan. | Face or top |
| *Saxifraga cotyledon* and vars. | 18in. | White | Oct.-Jan. | Face and top |
| *Saxifraga megasea* .. .. | 12-18in. | Rose | Sept.-Oct. | Face or top |
| **Scabiosa atropurpurea* .. | 18-24in. | Various | Nov.-May | Face |
| *Sedum acre aureum* .. .. | 3in. | Yellow | Oct.-Jan. | Face or top |
| *Sedum glaucum* .. .. | 3in. | White | Summer | Face or top |
| *Sedum spectabile* .. .. | 12-18in. | Rosy pink | Summer | Face or top |
| *Sempervivum arachnoideum* .. | 3in. | Reddish pink | Summer | Face or top |
| *Sempervivum arenarium* .. | 8in. | Yellow | Dec.-Jan. | Face or top |
| *Sempervivum tectorum* .. | 12in. | Red | Dec.-Jan. | Face or top |
| *Senecio greyi* .. .. .. | 12in. | Yellow flower Grey foliage | Nov.-Jan. | Face or top |
| *Senecio laxifolius* .. .. | 24-36in. | Yellow flower Grey foliage | Nov.-Jan. | Face or top |
| **Silene alpestris* .. .. | 6in. | White | Summer | Top |
| *Silene schaftae* .. .. | 4in. | Rose, purple | Summer | Top |
| *Silene virginica* .. .. | 6in. | Crimson | Nov.-Feb. | Top |
| *Thymus serpyllum album* .. | 3in. | White | Nov.-Jan. | Face or top |
| *Thymus serpyllum coccineus* . | 3in. | Purple | Nov.-Jan. | Face or top |
| *Thymus serpyllum* var. *lanuginosus* .. .. | 5in. | Purple Grey leaves | Nov.-Jan. | Face or top |
| *Thymus vulgaris argentea* .. | 8in. | Purple, silver leaves | Nov.-Jan. | Face or top |
| *Tunica saxifraga* .. .. | Trailer | Pink | Summer | Face |
| *Verbena* various .. .. | | Red, blue, yellow, white | Nov.-May | Face. |
| *Viola gracilis* .. .. .. | 4in. | Violet | Summer | Face |
| *Wahlenbergia gentianoides* .. | 10in. | Blue | Oct.-Jan. | Face or top |
| *Wahlenbergia pumilio* .. | 3in. | Violet | Oct.-Jan. | Face or top |
| *Wahlenbergia serpyllifolia* .. | 3in. | Violet | Oct.-Jan. | Face or top |
| *Yucca angustifolia* .. .. | 18in. | Cream | Jan.-March | Face or top |
| *Zauschneria californica* .. | 12-18in. | Scarlet | Jan.-March | Face or top |



Below left—A herbaceous border of dianthus species softens the hard lines of the concrete. The wall suffers from lack of planting holes, with the result that an impression is created of a solid massed effect of unbroken flower border from the edge of the path. Below right—After one season's growth trailing plants put out in a border at the top of the ugly concrete wall have clothed it to a depth of 3 to 4ft. The plant on the corner is *Convolvulus mauritanicus*. The other plants are mesembryanthemum (Livingstone daisy) species. If planting holes had been put into this wall, the plants would have covered the whole of the wall and other than trailing plants could have been used to give treble the interest to the wall.

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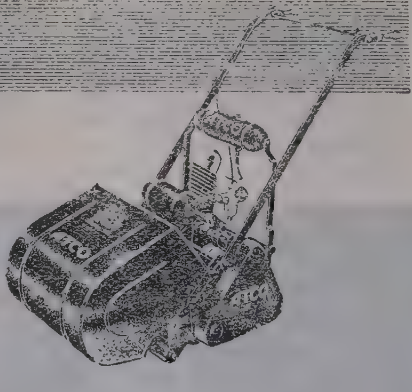

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Some people object to the use of concrete on the ground of colour, contending that it is harsh and offends the aesthetic eye. This may be overcome to some extent by using coloured cement or plaster or some of the many types of concrete paints now available.

When using concrete or clay bricks it is advisable to bond the material as previously described for stones in the dry wall. For a retaining wall a slope of 6in. off the vertical in every 3ft. of rise should be provided, with more holes for planting and for drainage. The tilt is governed to a large extent by the slope on the foundation but can be influenced when the soil or cement is placed between the bricks.

August and September are the best months for construction in Christchurch; north of Christchurch July and August would probably be suitable, and in Dunedin and Invercargill the work would be better done in September and October. Seed may be sown in the crevices in spring in a mixture of chopped-up moss and moist, sandy soil.

In the selection of plants the aspect of the wall has to be considered; sun-loving plants should be chosen for the northern aspect and shade lovers for the wall facing south. Good contact with the soil should be ensured by spreading out the roots of plants so that they penetrate the soil at the back of the wall.

The shady side of the wall is excellent for the use of various hardy ferns and plants such as violets, auriculas, primulas, lilies, etc.

The top of the wall should be covered with 6in. of soil, which needs to be rammed down to provide a firm site for such subjects as rock roses, wallflowers, antirrhinums, sedums, saxifraga, *Kalanchoe* (*crassula*) *coccinea*, and prostrate rosemary. Some large stones placed at intervals along the top help to keep the soil in place.

The sunny face offers a position for such plants as opuntias and epiphyllums, mesembryanthemum species, echeverias, sedums, sempervivums, and other sun-loving plants such as dwarf hypericum, prostrate campanulas, dwarf manuka, gypsophila rosy veil, miniature roses, and acis, nerines, amaryllus, crocus, romuleas, and hypoxis.

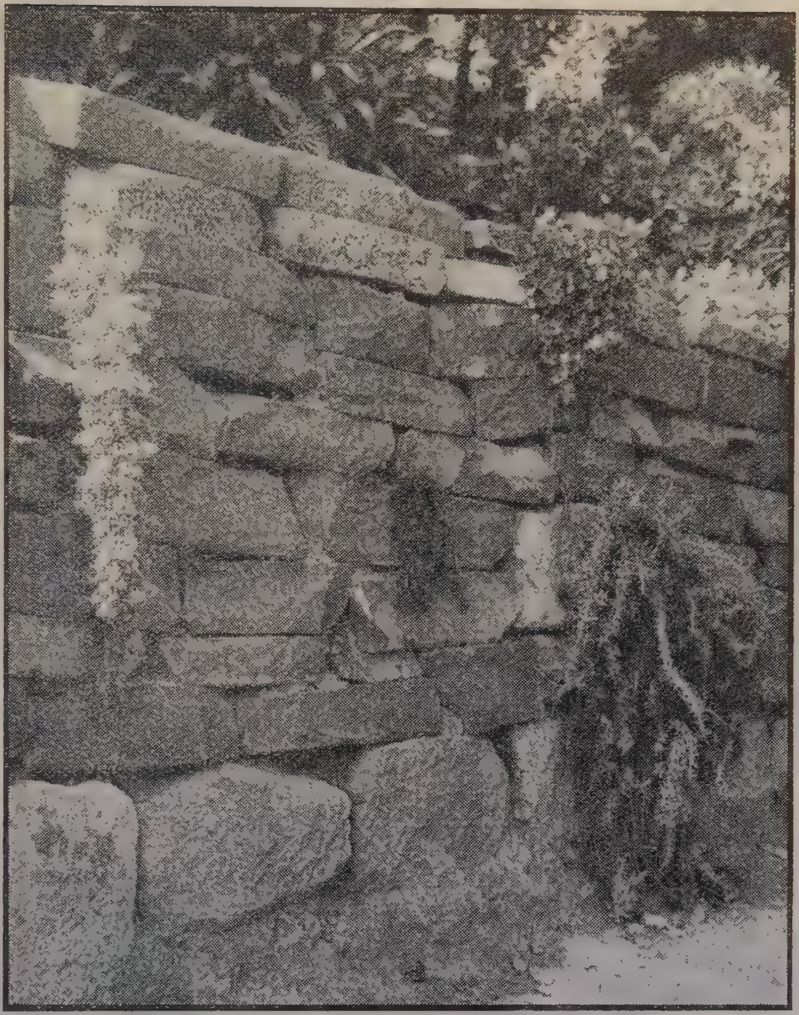
When plants are set out in groups according to variety a more attractive display is given than where they are planted individually. Four plants in a group provide a more natural effect.

Continuous interest is added to a garden wall if plants are grouped to flower at different times of the year.

If several groups close together flower at approximately the same time harmony of colour should be considered.

Contrasting colours do not create a sense of peace which a blend of colour gives. Generally all orange reds, yellow pinks (salmon pink), oranges, and yellows may be associated and in the other group are blue reds (crimson as found in stocks), blue pinks (rose pink as found in gypsophila or carnation), blues, and purples. Intermediate between the two colour groups are found the greys and whites and perhaps pale yellow. These intermediate colours often serve as a link between two colours which would otherwise clash. As part of the joy in wall gardening is the working out of a suitable colour scheme to suit one's taste, a list of plants is given.

To control pests which attack the crown of gypsophila and alpine phlox and the leaves and petals of dianthus and violas, D.D.T. 50 per cent. wettable powder should be applied as a spray at a strength of 2 teaspoons to 1 gallon of water. For aphides and scales use 1 per cent. summer oil plus 1 in 800 of nicotine sulphate. For fungous diseases copper oxychloride, lime sulphur, or Bordeaux may be used. Some plants will not tolerate some modern spray materials; for example, chrysanthemums dislike Hexone (H.E.T.P.). It is therefore wise to spray always with caution until the reaction of plants is known.



*[V. C. Browne*

A stone retaining wall with trailing plants in bloom. The foundation stones should be sunk at least 10in. into the ground and placed on a solid rammed foundation. This wall was built with very little forethought for the needs of plants growing on its surface. The stone should be sandwiched with 1 to 3in. of soil packed into position. The interstices between the stones may be 2 to 4in., being larger between big stones. Plants are set in soil packed between the stones. In spite of certain faults in construction of this wall, trailing campanulas are making a brave show on it and *Rosmarinus officinalis prostrata* appears to be thriving.

## Garden Work for September

September can be considered a general sowing month for most flower seeds.

### Half-hardy Annuals

The sowing of half-hardy annuals in boxes under cover may be continued. It is advisable to cover the boxes with glass and brown paper to avoid rapid drying out of the soil and to provide shade. Once the seed has germinated the coverings should be removed to admit more air and light, but light shading should be given from direct sun. Young seedlings from previous sowings should be

# *Home Cooking* — *Recipes that appeal*

### SPONGE SANDWICH

3 eggs, 4oz. sugar, 1oz. flour, 2oz. **Edmonds Maize Cornflour,** 1 teaspoon **Edmonds Baking Powder** ("Sure-to-Rise" or Acto), 1oz. melted butter.

Beat eggs and sugar until thick and fold in sifted dry ingredients then add melted butter. Put into 2 sandwich tins (8 inches) which have been greased and floured. Bake 20 minutes in moderate oven (375 deg. F.).

### MOCK CREAM FILLING

1½ teaspoons **Edmonds Maize Cornflour,** 2 tablespoons icing sugar, ½ cup milk, 2 tablespoons butter.

Mix cornflour and milk together into a smooth paste then boil 3 or 4 minutes. Cream butter and sugar and then add cornflour gradually when cold. Beat well. Flavouring may be added.

### MELROSE CREAM

Equal quantities of custard made with **Edmonds Custard Powder,** and liquid jelly made with **Edmonds Jelly Crystals.** Mix together and put into mould to set. An attractive dish can be made by surrounding the above with different coloured jellies from small moulds (Egg cups will do).

### VELVET PUDDING

2 cups milk, 2 dessertspoons **Edmonds Custard Powder,** 2 eggs, 1 dessertspoon butter, 4 tablespoons sugar.

Mix custard powder with a little of the milk and stir in the egg yolks. Heat remainder of the milk, pour in the mixture, add butter, cook 5 minutes, then pour into a piedish. Beat egg whites stiff, add sugar and pile on top. Brown in a cool oven.

### ORANGE SNOW

Make up two separate jellies, using one packet each of orange and raspberry **Edmonds Jelly Crystals.** When orange is nearly set whip whites of two eggs to a stiff froth, add to jelly and whip for about ten minutes till light and feathery. Put away in dish in cool place to set. Decorate with the raspberry jelly and serve.

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pricked out as soon as they become large enough to handle to avoid weak leggy plants.

## Hardy Annuals

In early districts where the soil is more likely to be in a workable condition seeds of many hardy annuals may be sown outdoors. If the soil cannot be readily brought to a fine tilth by raking, seed sowing in the open should be postponed until conditions are more suitable.

The sowing of flower seeds at intervals in small batches is recommended, as a succession of bedding plants can be produced and a succession of blooms obtained in the borders. Some of the flower seeds that may be sown outdoors where mild conditions prevail are larkspur, cornflower, candytuft, alyssum, cosmos, sweet peas, calendula, nigellas, godetia, annual chrysanthemum, helichrysum, virginia and evening-scented stock, clarkia, mignonette, and shirley poppy. Sowing may be done in patches, circles, or rows, but should be thin to conserve seed and avoid weak plants and excessive thinning later.

## Sweet Peas

Sweet peas are in demand for decorative purposes. A prolonged display can be secured by successive sowings starting from early spring until November. Sweet peas have considerable value when grown as groups throughout the flower border. The sites chosen should be dug deeply and thoroughly manured with organic material. The seed may be sown in a ring round tall brush or columns of netting wire supported by stout stakes, and the plants will eventually climb over this and make a pleasing display.

## Lawns

Autumn-sown lawns may need consolidation of the surface by rolling and an initial cut as soon as the state of the ground permits. If circumstances make the sowing down of a lawn necessary at this time of year, it should be done at the first opportunity, as poor results may follow a spring sowing if a hot, dry summer is experienced and water is limited.

The recommended seed mixture is 2 parts of New Zealand chewings fescue and 1 part of Government Certified browntop sown evenly at 1oz. to the square yard.

In established lawns a fertiliser mixture of 3 parts of sulphate of ammonia and 1 part of superphosphate may be applied in September at 1oz. to the square yard and thereafter every 3 months to maintain healthy growth and control of weeds.

The dressing should be applied more often to newly sown areas if the young grass appears yellow and unhealthy.

If moss becomes aggressive, an early-spring treatment may be given by applying the following mixture: 3 parts of sulphate of ammonia and 1 part of sulphate of iron at 1oz. to the square yard.

## Rose Pruning

Pruning of roses should now be completed even in southern districts and after a spray of Bordeaux mixture (in the proportions of 1lb. of copper sulphate, 1lb. of hydrated lime, 10 gallons of water) or lime sulphur solution (in the proportions of 1 gallon of lime sulphur to 15 gallons of water) the beds should be lightly pricked over with a fork, care being taken not to damage any surface roots.

[*Douglas Elliott*

Where mild conditions prevail the seed of clarkias may be sown outdoors now.

A generous dressing of well-decayed animal manure, compost, or leaf-mould should be spread over the surface of the bed to prevent the soil from drying out and to maintain the humus content.

## Gladiolus

The main plantings of gladiolus corms are usually made in September and October for the chief summer display, although some corms should be saved for a planting in November to extend their period of flowering. Liberal dressings of old, well-rotted animal manure, compost, or other forms of organic matter worked into the soil some months before planting will be beneficial.

Only sound, healthy corms should be planted, as the gladiolus suffers from several troubles which unfortunately may be carried over in the corms from one season to another. It is a wise precaution to dip all the corms just before planting in a solution of 1 part of acid mercuric chloride to 1000 parts of water. The corms should be left in the solution for 2 hours and then drained, allowed to dry, and planted at once. Care must be taken, as the mercuric chloride is highly poisonous and it is necessary to use a glass or wooden container for it. Average-sized corms should be planted 6in. down in deep, light, well-drained soil. A depth of 3in. may be sufficient in a heavier, shallow soil.

## Dahlias

Dahlia tubers set out in boxes last month to encourage new growth may be propagated in two ways as the shoots appear. The clumps may be divided carefully by pulling them apart with perhaps an occasional small cut, but it is important to see that at least one healthy shoot is attached to all portions kept for replanting. Three-inch cuttings may also be taken by removing shoots as they become large enough and then inserting them in a pot or box of clean, sharp river sand, which should be placed in a close frame or glasshouse until rooting takes place.

## Begonias

Begonia corms if put out last month should be showing some growth and if exceptionally large they may be divided up, providing a shoot is retained on each portion, and then potted up into 4in. or 5in. pots until firm root growth is made. Given warm humid conditions they will develop rapidly. If desired, some 3in. to 4in. cuttings may also be taken as the shoots develop. Young plants of begonia, streptocarpus, and gloxinia raised by seed sown earlier will need careful transferring to pots or boxes as soon as they are large enough to handle.

## Hydrangeas

Hydrangeas should be pruned now in cold districts or where this work was not done in autumn. It is not advisable to prune back all growths, as the terminal buds of well-developed shoots of the current season's growth almost invariably contain the dormant flower bud, and with a few exceptions the large buds which are arranged in pairs near the terminal contain the same formation. It will be obvious that the hard pruning of all shoots often done by the home gardener means that mostly only leaf buds are left for the following season's growth.

Weak growths and those which have flowered should be removed to leave a reasonable proportion of strong new shoots uncut to produce next season's flowers.

Well-decayed organic manure or blood and bone lightly forked in around the bushes at this time of year will prove beneficial.

## Herbaceous Perennials

It is advisable at this time of year to remove or thin some of the excess growth of many of the vigorous growing varieties of herbaceous perennials such as delphiniums, michaelmas daisies, perennial phlox, rudbeckias, and heleniums.

If all shoots are allowed to grow, smaller flowers and a poorer display will often result.

## Planting out

With improved weather conditions weeding will be a major job and hoeing and hand weeding should be started as soon as soil conditions permit. When beds and borders have been cleaned and forked over the following bedding plants may now be planted. Iceland poppy, antirrhinums, pansy, violas, pentstemons, and calceolaria. Plants like arctotis, gazania, geraniums, and paris (tree) daisies should have excess growth trimmed back when all danger of frost is past.

## Climbing Plants

Climbing plants such as *Clematis jackmani*, wistaria, virginia creeper, *Solanum jasminoides*, and ornamental grape should be pruned at the first opportunity before growth begins. Thin, weak growth and dead and tangled wood should be removed and the strong, clean growths tied in which are necessary as a framework to cover structures or walls.

# Food Prejudices Often Lead to Bad Dietary Habits

By EVELYN E. MOORE, Field Officer in Rural Sociology, Department of Agriculture, Palmerston North

FOOD, recipes, dieting, and allied subjects are probably fairly frequent topics of conversation with most housewives, and information regarding them is thus acquired from many and varied sources. As this somewhat casually acquired information, along with a consideration of family likes and dislikes, is probably the basis on which the average housewife prepares her daily menu, it is not surprising that it has resulted in many New Zealanders developing food habits which could easily be improved.

THOUGH bad dietary habits may occasionally be traceable to lack of money to spend on food, often they are caused by the development of prejudices against nutritious foods. Some foods have in some manner or other gained a bad reputation, usually without any good reason at all. Consequently in this article it is proposed to discuss some of the common misconceptions regarding foods and dieting.

Often foods are condemned as being indigestible, constipating, or fattening or are even claimed to make the blood acid, statements which cannot always be qualified or which may even be completely unjustified. For example, many foods have gained a reputation for being indigestible, with the possible result that many people avoid such foods entirely, perhaps to the detriment of the nutritive value of their diet.

Such foods as cabbage, cheese, wholemeal bread, and pork, for example, are regarded with permanent suspicion by some who are often ready with advice to others to avoid them also. Such foods may not be as rapidly or as easily digested as some refined foods, but the normal healthy person is perfectly capable of digesting any or all of them with no detriment to health; in fact as many of the so-called indigestible foods have a high nutritive value, they are much more likely to promote good health, provided, of course, that they are eaten in reasonable quantities and as part of a well-planned meal properly cooked and attractively served.

Other foods have gained a bad reputation through prejudice. Liver and milk are examples, and though this attitude is probably slowly changing, they are two of the most highly nutritious foods readily available to all and can play an important part in maintaining a high standard of health.

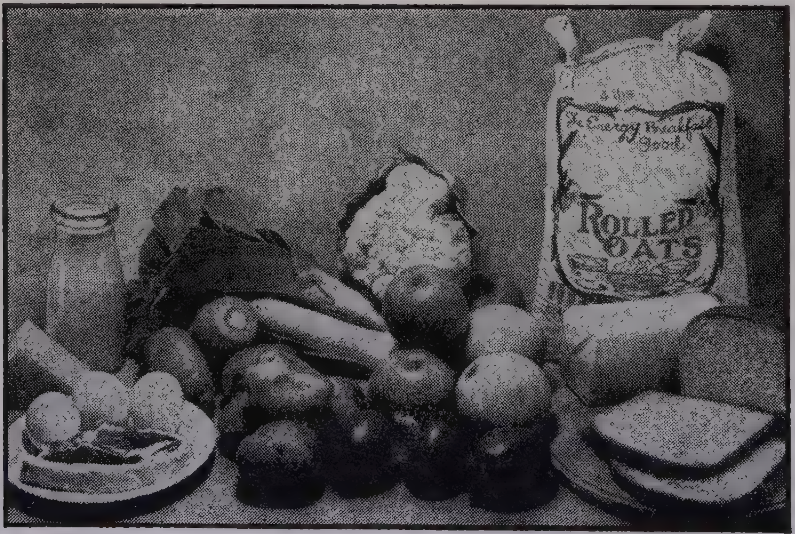
There are also other nutritious foods which may be quite unjustly blamed for causing certain ailments; for example, various foods, particularly cheese, may be called constipating. There are many causes of constipation, but it is wrong to tag any food eaten in normal quantities in a well-balanced diet with such a label. One important fact to remember is that in evaluating a diet the diet as a whole and not just one food should be considered. Where the diet leads to the development of constipation it does so frequently because it consists mainly of highly refined foods such as white bread, sweets, tea, jam, cakes, and desserts such as jellies (without fruit or milk), and steam puddings or pastries of the type which have a high energy yet comparatively low nutritive value. Vegetables, fruit, wholemeal bread, milk, cheese, and eggs on the other hand often occupy a very minor place in the daily menu.

Another frequent misconception is that certain foods are acid and will therefore make the blood acid, and consequently it is said that they should be rigidly excluded from the diet of anyone with a tendency toward rheumatism or arthritis. Fruits in particular are often condemned. The human blood is slightly alkaline and remains so no matter what foods are eaten. It is only rarely that the blood may become acid with resultant danger to life. In addition many fruits are valuable sources of vitamin C*, for which in some cases of rheumatism there is an increased need; such fruits should therefore have a prominent place in the meals of sufferers from this complaint.

Other dietary fads are frequently found on examination to be equally without foundation, for it is not individual foods, but over-indulgence in one particular food, sweets and cakes, for example, to the detriment of other more nutritious foods which produces an unbalanced diet and which may ultimately have ill effects on health.

It is true that there are certain diseases and ailments which call for dieting and the avoidance of certain foods in their treatment, but this does not mean that these foods are better excluded from the dietary of the average healthy person. Indeed when certain foods are excluded a diet often has to be carefully planned by a doctor or dietitian so that it may still contain all the nutrients essential for health.

Finally the most health-promoting diet is invariably not the one set about with many fads and fancies, but is that selected from a wide variety of foods with due regard to the inclusion of sufficient of each of the main health-providing classes of foods, milk and milk products, eggs, vegetables, fruit, meat, and whole-grain cereals.



[*Sparrow*

A selection of foods from the main food groups—wholemeal bread and cereals, milk and other dairy products, eggs, meat, green and root vegetables, and fruits—simplifies meal planning and makes it economical.

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* A vitamin is one of the many substances (nutrients) that the body requires for its complete and healthful functioning and without which health cannot be maintained. Its deficiency in the foods making up the diet leads to disease, in extreme cases to death.

# Special Problems in Laundry Work

**IN last month's "Journal of Agriculture" Maud B. Strain, Field Officer in Rural Sociology, Department of Agriculture, Dunedin, described correct laundry treatments for special materials and gave advice on suitable soaps and detergents, and in this, the second and concluding portion of the article, she deals with furnishing materials, blankets, and various other items.**

THE routine week-to-week washing is only a small fraction of the potential laundrywork in the household. The remaining items, though needing less frequent attention, require a little more thought, time, and care for successful results. The problems encountered may be due to colour, design, or construction of the fabric, but no matter what the cause it is the housewife's responsibility to keep the items aesthetically attractive.

## Furnishings

With draperies and furnishings the question of shrinkage must be considered, and if there is any possibility of appreciable shrinkage, laundering should not be attempted. Any lined draperies are a risk because of the possibility of different degrees of shrinkage in the two materials, even a very small variation having a noticeable effect. Eiderdowns are difficult and a considerable risk for home laundering, and it is safer to send them to an experienced dry-cleaning firm; however, directions for laundering them have been included in this article.

### Bedspreads

Bedspreads should be washed by the methods suitable for their composition, that is, according to whether they are of cotton, linen, rayon, or other fibres, and for their colour. Chenille bedspreads should be washed in lukewarm water with good suds as soon as they show soiling and then rinsed three times, the first time in water at the same temperature as the washing water. The wringer should be slackened off to give light pressure. After being passed through the wringer a bedspread should be shaken gently, stretched to shape, and hung wrong side out so that equal lengths are each side of the line. No ironing is necessary.

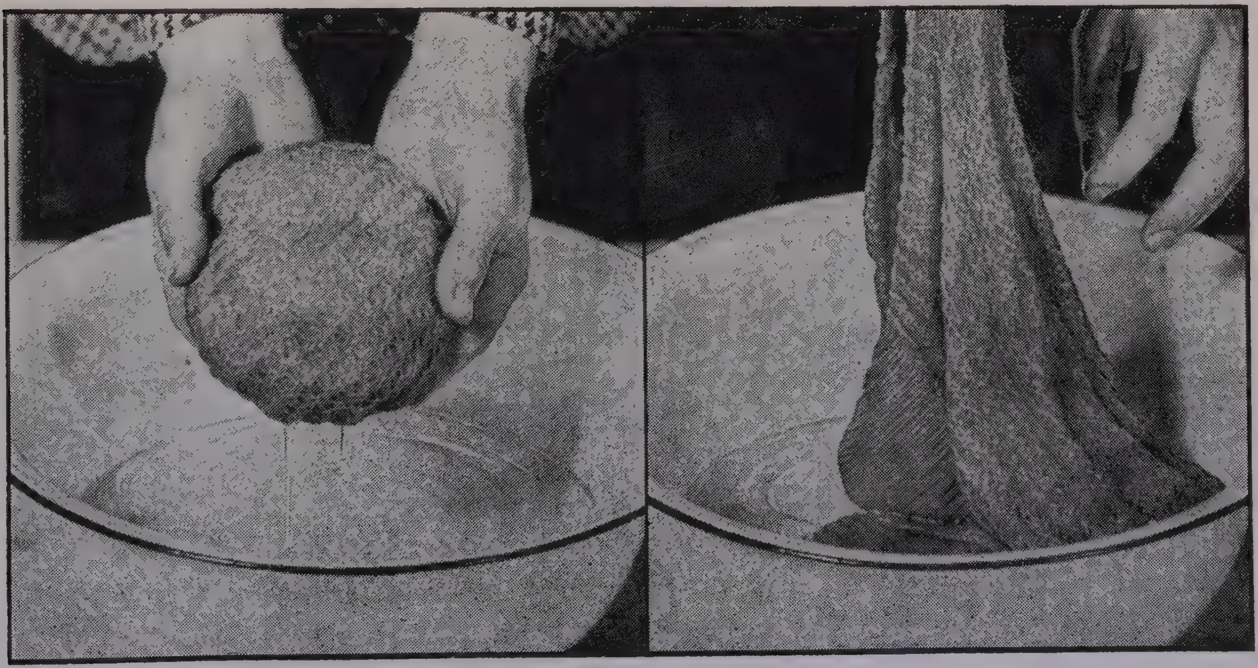
### Blankets

The same care is needed for blankets as for other woollens. The whole washing process for woollens should be carried out as gently and as quickly as possible. The temperature of all waters used should be the same throughout. Thorough rinsing is essential, as soap left in tends to spoil the softness and delicacy of wool. When wet the articles should be lifted by both hands held underneath to give proper support and to guard against stretching. Woollen articles must never be rubbed; the suds should be squeezed gently through until the dirt disappears.

When badly soiled areas on a blanket are to be cleaned the blanket may be laid out flat on a table and heavy suds worked through the fabric of the soiled part with the palms of the hands, a circular motion being used. This is done before the whole blanket is wetted. Opinions as to the correct method of washing blankets differ in detail, but all methods aim to produce clean, soft, fluffy blankets that have not shrunk or yellowed in the process. It is necessary to avoid changes of temperature, alkalis, and heat, and to avoid leaving the blankets wet longer than is necessary. Three methods, all well tried, are given here, as one method may be suitable when another would be impracticable.

A good drying day should be chosen, one on which there are not likely to be interruptions, and everything needed such as soap jelly, detergent, or borax should be in readiness before the blankets are wetted. Only neutral soap or soapflakes should be used, as strong alkalis cause yellowing and harshness in wool. Blankets should be hung over two lines to distribute the weight more evenly, and in a dry, shaded spot. If they are turned once or twice, drying will be hastened, and if they are shaken at the same time, it will help to make them fluffy. When dry the blankets should be brushed with a soft brush to raise the nap, which enables them to enclose more air, thus making them warmer.

**First method:** Lukewarm water is used throughout, at the same temperature for all stages. New blankets may be steeped for a few minutes in water containing a mild alkali such as borax (about 1½oz. to each gallon of water) to neutralise any acid left in the wool by the bleaching process. Ammonia, being strongly alkaline, should not be



Washing of woollens. All woollen articles should be lifted by both hands as in the illustration at left. If lifted by one corner, as shown at right, they will be stretched and lose shape.

used with woollen goods. Steeping the blankets for a short time, even if they are not new, is an advantage, because they become acid after a long period of use. A synthetic detergent may be used in the steeping water, and this will make easier the subsequent washing. The blankets are transferred from this steeping solution directly into the washing water, which should contain sufficient soap to produce a 3in. lather and ¼oz. of borax per gallon of water.

If a washing machine is used, it is advisable to do one blanket at a time, because if the blankets are tightly packed, the agitation needed for washing is so impeded as to be almost lost. The machine should be run for 1 minute then stopped for 2 minutes, this routine being kept up for 10 minutes, during which the blanket is being agitated for only 3 minutes. If a blanket is heavily soiled, it should be given a second wash before being rinsed. If rinsing is done in the machine, this should be run for ½ minute, stopped for 1 minute, run for another ½ minute, then drained, and the process repeated twice.

If washing is being done by hand, it must be remembered that owing to the bulk and thickness of a blanket, a considerable amount of lifting and squeezing is necessary to force the dirty soap solution out into the rinsing water. Finally the blanket is passed and repassed through the wringer until no more water is expressed, shaken, and hung over the lines with the coloured borders vertical. Changing the position occasionally assists drying and avoids the formation of permanent creases. When blankets are taken from the line they should be shaken, brushed if desired, folded, and aired.

Blankets are no more liable to felt and shrink when washed in the machine than with careful hand washing, provided they are not left in the machine too long and provided the pressure on the wringer is not excessive.

For maximum cleansing and minimum shrinkage:—

1. The blankets must not be tightly packed.
2. The machine should be stationary when the washing water is draining away and when the rinsing water is running into it.
3. The action of the machine should be interrupted so that there is not a continuous washing or rinsing action.

For a good colour:—

1. Neutral soap and a quarter of its weight of borax should be used.
2. The blankets should be steeped in water containing borax or synthetic detergent.
3. A good lather should be maintained during washing.
4. Adequate rinsing is required.

**Second method:** This method is taken from an article written by Elaine Knowles Weaver, Associate Professor of Home Economics at Ohio State University, and published in "Electricity on the Farm Magazine". It embodies the conclusions arrived at after lengthy research and describes how to launder blankets safely in either automatic or non-automatic washers.

1. Fill the machine with water which is comfortably warm to the hands.

2. Add detergent. For a "sudsing" variety use enough to get 2in. of suds; with a low-sudsing type use about 2/3 cup for each 10 gallons of water.

3. Operate the washer till the detergent is dissolved.

4. Examine the blanket for badly soiled spots or streaked bindings. If they are present, scrub them with a vegetable brush and detergent water.

5. Place the blanket in a washer and allow it to soak for 15 to 20 minutes. Turn it over once or twice by hand.

6. Extract the water by spinning or by passing the blanket through the wringer; then empty the washer.

7. Refill the washer with water of the same temperature used in the washing and soak the blanket for 5 minutes, turning it right over by hand once or twice.

8. Extract the water and repeat the rinsing in lukewarm water.

9. Stretch the blanket vigorously. This is simpler if it can be done by two persons. If it has to be done single-handed, place the blanket over a line, draw the hems together, and pull evenly up and down the hems.

10. Dry the blanket over two parallel lines, or turn it during the drying if it is across only one line.

11. When the blanket is dry lay it on a flat surface and brush it vigorously with a stiff, perfectly clean clothes brush or a nylon hair brush.

12. Sponge and press the bindings.

This method of "soak laundering" is said to eliminate the hazard of matting and shrinkage. It is claimed (after 500 laundering tests of new and used wool blankets in different washes) that "new blankets shrank only a trifle, or not at all, and used blankets badly shrunken in previous laundering were reconditioned and elongated 4 to 6in. when finished by stretching and brushing."

**Third method:** This method applies not only to blankets, but gives excellent results with all woollen articles.

The requirement that the temperature of washing water for wool must be the same throughout is easily followed in this method by the use of cold water; not only will all the washing waters be at the same temperature, but there will not be much difference compared with the drying temperature outside. Soiling is only loosely held in woollen goods and can be removed without difficulty by squeezing and pressing mild soap suds through the fabric. The articles should be rinsed until the water remains clear, then dried and finished off in the manner appropriate to each article. Blankets should be stretched and shaken before being hung outside in a shaded place. Experience over a period of years has shown this to be a most satisfactory method, resulting in clean, soft, fluffy blankets without any felting or shrinkage. Blankets have been hand-washed throughout, except for the use of an electric wringer. An obvious disadvantage is the discomfort of working with cold water during many months of the year.

### Curtains

Curtains vary widely in fabric, colour, and thickness, depending on their use. In general they are laundered according to their fibre and weave, but special precautions will be necessary if they are heavily soiled or weakened in places through exposure to sunlight and air. This applies especially to curtains made totally or partly of rayon. Soiling is usually caused by coarse particles of dust and grit, and often by acid owing to exposure to the atmosphere. Before being washed curtains should always be shaken to remove as much loose dust as possible, and pins should be removed and holes mended.

**White cotton, lace, and net curtains:** Large curtains may be folded to reduce the size and tacked loosely. Steeping them in two or three lots of water helps the removal of dirt. Half an ounce of modified soda (a mixture of equal quantities of washing soda and baking soda) per gallon of water may be added with advantage. If being washed by hand and boiled in a copper, the curtains should be handled carefully; being fragile, they should be squeezed and pressed rather than rubbed. Tying them in a sheet is a safeguard against tearing, and they can be lifted from the copper by the knot in the sheet. If they are washed in a washing machine, they should be placed in a pillow slip or bag. After thorough rinsing they should be passed flat through the wringer, any tinting or starching necessary being done at this time. It is advisable to starch a pair together to be certain of even stiffness.

After the curtains have passed through the wringer tacking threads are removed. The curtains are adjusted to their proper shape and dried evenly on the lines. If an area of grass is available, the curtains may be laid out flat and dried that way. The drying of curtains is important, because if they dry out of shape, they cannot be made to hang evenly on the window. Curtains fixed on top and bottom rods may be put back on the window and dried in position.

Curtains should be ironed on the wrong side while slightly damp. If carefully done, ironing with slanting strokes across the width, after first making sure the hem is straight, avoids uneven stretching of the edges as sometimes happens when ironing up and down. Folding should be across the width because such folds hang out.

**Coloured curtains** are laundered according to their fibre composition, that is, whether they are cotton, linen, or other material, and according to whether the colours are fast or fugitive. Heavy curtains of chenille or velour should be moved up and down in a large tub of soapy water or washed in a rotary-type washing machine, rinsed well, and without wringing hung up to dry.

### Eiderdowns and Sleeping Bags

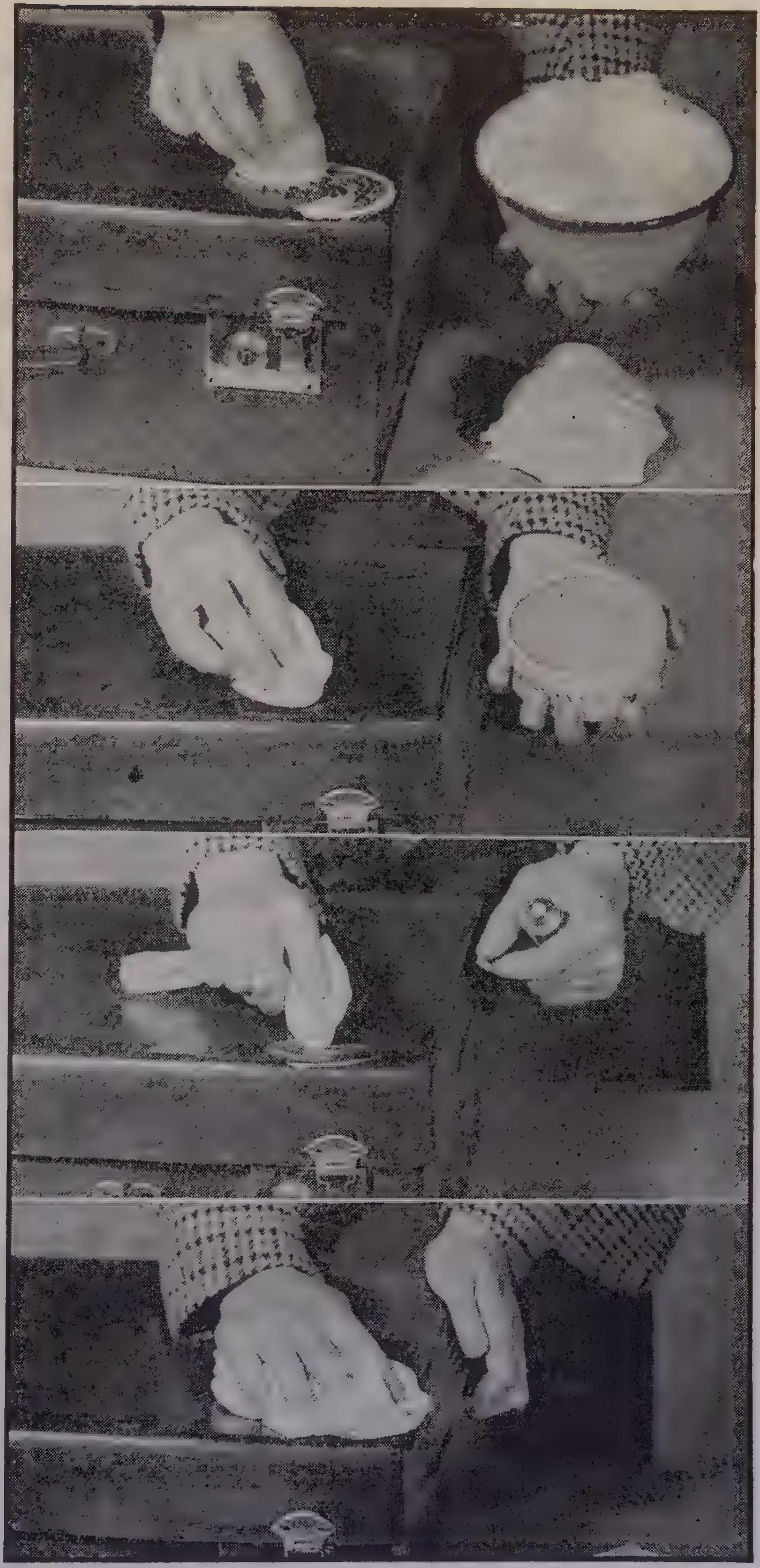
Unless the covers of eiderdowns and sleeping bags are of strong material, it is inadvisable to try washing them, because materials such as rayons lose strength when wet and may be split by the pressure of water while they are being wrung. Another disadvantage is that washing will remove from some coverings the dressing which makes them "down proof". This is most undesirable where there is no inner case for the down. Eiderdowns and sleeping bags are bulky and difficult to dry and washing should not be attempted unless there are good facilities for drying outside, a breezy, good drying day, and a sufficiently large wringer. Warm soapy water should be used, and a second washing water will be necessary if the covering is very soiled.

To lessen the chances of splitting the cover it is advisable to lift the eiderdown or sleeping bag from the water on to a board placed across the tubs and press out as much water and air as possible before passing it through the wringer. Also there must be only low pressure on the rollers. The article should be folded to fit the wringer and carefully and evenly fed in, as any drag on it may produce a tear; a strict watch must be kept to see that the cover does not become distended by water unable to escape sufficiently quickly. Thorough rinsing is essential. The article should be shaken and the down re-arranged, after which it should be hung over two lines to support the weight more evenly. Frequent shaking is necessary during the drying period to loosen the down, and finally, when the article is dry, the cover should be ironed with a cool iron and the down evenly distributed by manipulation with the fingers.

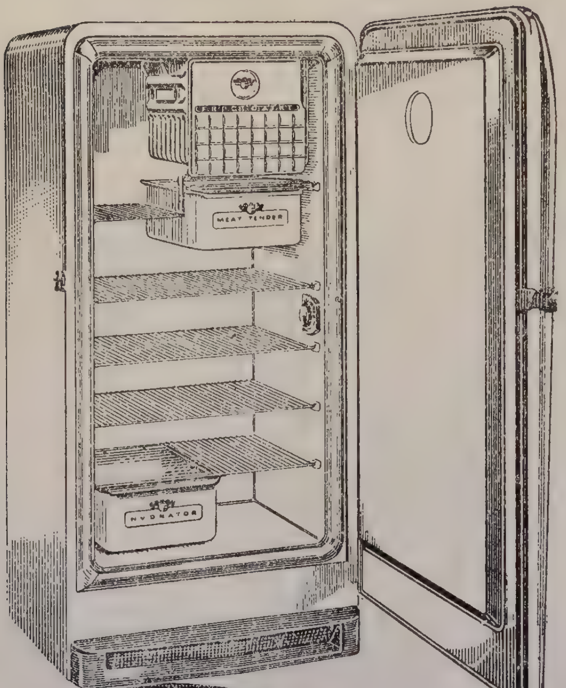
Experience has shown that it is difficult to make a thoroughly satisfactory job of washing an eiderdown at home. If all traces of soapy water are not removed in the rinsing (this is not easy on account of the eiderdown's bulk, especially if feathers are mixed with the down), the colour of the cover is liable to be patchy. Unless the filling is firmly held in place with closely arranged quilting, it easily forms lumps with corresponding lean patches, and the number of times the article must be passed through the wringer causes a constant danger of splitting the cover or seams.

**Loose Covers**

The loose covers of chairs and other furniture should be tested for colour fastness and shrinkage before being laundered. If this is not possible, dry cleaning is safer than wet cleaning. The covers should be vacuum cleaned before they are removed from the chair, shaken vigorously to remove all loose dust and dirt, and washed in lukewarm water with rich suds made from neutral soap. They must be rinsed thoroughly and dried quickly, care being taken that they are not pulled out of shape while drying. They should be pressed while still damp, first on the wrong side, then on the right, along the seams and cords, the fabric being pulled taut. After the



At right—Reconditioning a leather suitcase. Top—The leather is sponged with lather made from neutral soap flakes. The lather is then rinsed off with a damp cloth and the leather dried with a soft cloth. Upper middle—A conditioning dressing is then well rubbed into the leather. Before further treatment the suitcase is put aside for a few days. Lower middle—If a polished surface is wanted, a good leather-polishing cream is applied and the leather rubbed vigorously (bottom) with a soft, dry polishing cloth. This treatment is not suitable for suede.



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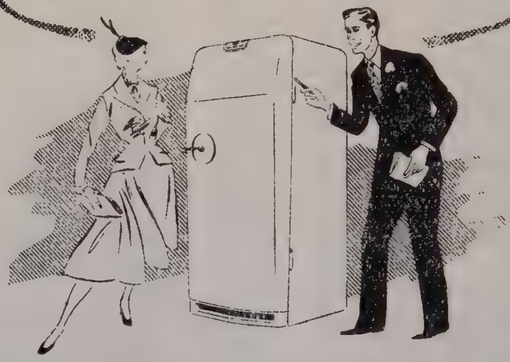

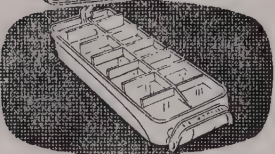

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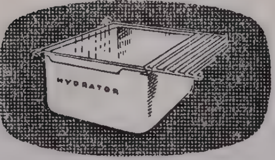

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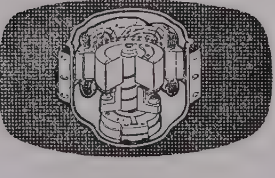

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seams are pressed any flounces and pleats are ironed, then the seat, back, and arms. Slip covers will fit better if they are not ironed completely dry, but are replaced on the chair while still slightly damp, the seams being pulled to match the lines of upholstery and any extra fullness which may have developed being tucked in, or if necessary, tacked down in an inconspicuous place.

## Infants' Clothing

Infants' clothing should be washed separately from other clothing, and as it is usually made of more delicate fabrics, is best washed by hand. Apart from these special precautions infants' garments are done in the same way as other garments, that is, washed in the manner suitable for the fabric of which they are made. Only pure soap should be used, not soda or washing powder.

### Diapers

A covered pail of cold water should be kept for diapers and as soon as a diaper is removed it should be placed in the pail. The diapers should be boiled each day to sterilise them and maintain a good colour; if this is not possible every day, they should at least be scalded with boiling water. They must be well washed and thoroughly rinsed (blueing is not necessary) to remove every trace of soap. Soap left in the fabric is liable to cause skin irritation, as is blue, which contains a high proportion of baking soda. Wherever possible diapers should be dried in direct sunlight, shaken, folded, and well aired.

### Cotton and Linen Garments

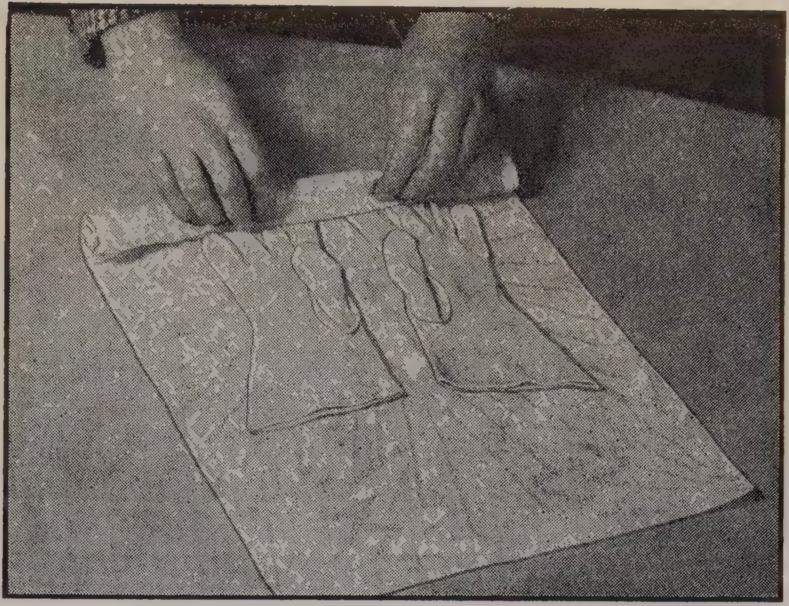
Cotton and linen garments are laundered in the same way as other personal linen, except that if they are soiled as are diapers, they need the same treatment.

Nothing that could possibly come in contact with a baby's skin should ever be stiffened. If desired for any very special occasion, a slight stiffening with gum water (instructions for making gum water were given in the first part of this article in last month's "Journal"), is permissible for skirts of frocks or robes, but on no account should parts which touch the skin, such as neck bands, yokes of frocks, and sleeves have any stiffening.

### Woollens

Infants' woollens are usually light and open in texture and made from fine, soft wool to provide warmth without weight and to allow freedom of movement. They are delicate and should be laundered as such. A quantity of warm soft water, sufficient for all washing and rinsing, should be prepared. Enough soap jelly to make a good lather should be added to the washing water, and for new woollens a little borax should be added (ammonia should not be used). The garments should be squeezed, not twisted or wrung, and when being lifted from the water should be supported with both hands, the hands being placed underneath and the whole garment raised, and not pulled out of the water by one corner. Wool stretches and loses its shape very readily when wet. Rinsing in soft water is essential if the wool is to retain its original softness.

When woollens are being passed through the wringer the pressure on the rollers should be slackened. A garment may be folded in a towel and put through the wringer several times to extract as much water as possible. Garments, hand-knitted ones in particular, should be worked into shape and dried flat; bonnets may be dried on a small bowl to help them retain shape.



To extract water from gloves after they have been washed they should be rolled, from the fingertips toward the wrists, in a towel, the roll being kneaded as it is made.

Cod liver oil stains are sometimes troublesome. They may not be noticed at the time of soiling, and only become evident after the article has been washed. If they are treated at once, warm soapy water is sufficient, but an old stain requires other methods such as the following:—

1. Carbon tetrachloride may be applied to the stained fabric, which should be resting on an absorbent pad. The solvent dissolves the stain, which is absorbed by the pad underneath.
2. A small amount of pure lard may be rubbed into the stain and the affected part washed.
3. A solvent soap (made by dissolving 1 tablespoon of soap flakes in 2 tablespoons of boiling water, and as this mixture cools and thickens adding 2 tablespoons of amyl acetate) may be rubbed into the stain and the garment washed.

## Infected Clothing

Occasionally it is necessary to sterilise or disinfect articles of clothing and dressings. Sterilisation by boiling is simplest and most satisfactory for white cotton and linen. Infected articles should be kept separate from the general washing until they have been boiled for 10 minutes, as up to this stage they, and any soaking solution in which they have been kept, are infectious and capable of contaminating anything with which they come in contact.

Articles which cannot be boiled must be disinfected by other means. Soaking in a solution of 1 part of carbolic acid to 20 parts of water for 1 hour is suitable treatment for all types of fabric. Various other disinfectants readily available may be used instead of carbolic acid with equally satisfactory results.

**These disinfectants are poisons and all necessary precautions must be rigidly observed.**

## Leather Articles

White or very light-coloured leather articles such as gloves and belts should be dry cleaned. Leather gloves of other colours should not be washed unless they are labelled by the manufacturers as washable. No gloves that have ever been dry cleaned should be washed.

### Gloves

Washable gloves should be washed frequently, because heavy soiling has to be rubbed vigorously and this is injurious to their finish, dye, and surface. With the exception of chamois and doeskin gloves, they may be washed on the hands in lukewarm suds, badly soiled spots being brushed with a soft brush. When clean the gloves should not be pulled off by the fingers, but gently rolled off from the wrists and the excess water extracted by rolling them in a towel. They should be rolled from the finger tips toward the wrist, the roll being kneaded. The gloves should be blown into to puff them into shape, placed on a towel, and dried away from the sun or any artificial heat.

If cuffs or stitching are in contrasting colours, it is advisable to stuff white tissue paper inside the gloves.

If the gloves are too stiff when dry, they may be rolled in a damp towel for a few moments and the leather manipulated gently while it is damp.

Chamois and doeskin gloves are treated similarly, except that they are not washed on the hands, because they become soft when wet and might split along the seams. Slightly soapy final rinsing water assists the cleaning.

Other types of leather gloves may be sponged with a soapless detergent, rinsed, dried, and treated with leather cream.

**Coats, Bags, and Trimmings**

Coats, bags, and trimmings may also be treated with soapless detergent, which is especially suitable for suede. It must be remembered that the effects of wear cannot be removed and that cleaning emphasises fading and wear of the material.

## Specially Stained Clothing

Ordinary spots and stains on clothing such as food, ink, and grease marks are removed by methods appropriate to the type of fabric, consideration being given to whether it is washable or not. The cleaning of washable and unwashable materials was described in the "Journal of Agriculture" for February and March 1950.

Another type of discoloration, sometimes found on white woollen and silk articles and known as "yellowing with age", may be due to:—

1. The use of sulphur dioxide in the original bleaching of the wool and silk, which makes the bleached article tend to absorb oxygen from the air and return to its original colour. This is difficult to prevent, because of exposure of the material to the air during wearing and drying. The effect may be minimised by rolling silks in a towel instead of drying them outdoors and by avoiding bright sunshine when drying white woollens.
2. Gradual accumulation of iron from the water supply. This applies especially to wool, which readily takes up iron from the washing water. Little can be done to control this.
3. The effect, over a long period, either of using alkalis that are too strong or of not sufficiently rinsing out soap and mild alkalis which concentrate into the fabric while it is drying. The condition can be avoided by thorough rinsing and by the use of only the mildest alkalis.

## Trimmings

Trimmings sometimes necessitate the dry cleaning of an otherwise-washable garment.

Contrasting colours in piping and in bindings of buttonholes, ties, and sashes must be tested for colour fastness before a garment is washed, as there is danger of the colours running into each other or "marking off" when wet.

Imitation sequins, often made with a gelatine base which would soften or melt in hot water, should be removed if they are in the form of a motif which is stitched on; otherwise the article should be dry cleaned. Whole rows of sequins may be attached by one thread, and care must be taken not to break this thread.

Lacquered buttons and buckles should be removed before a garment is laundered. Warm soapy water, besides possibly damaging the lacquer, could cause staining from the lacquer to penetrate the surrounding material. Metal buttons, including those with a cloth covering, which may rust, are better removed.

Plastic trimmings, buttons, and slide fasteners may in some cases soften or melt with the heat, and care must be taken in washing garments with such articles not to have the water too hot and not to leave them in the water long enough for these fittings to soften and lose shape. Slide fasteners must be closed and lying flat before being passed through the wringer. In ironing care should be taken not to allow the iron to touch any plastic object.

## Articles for Dry Cleaning

In general the following types of articles are better dry cleaned:—

1. Heavy outer clothing which would hold too much water, might shrink, and would be disarranged by washing, as, for example, suits (woollen or worsted), overcoats, skirts, sports coats, and blazers.
2. Delicate fabrics of complicated construction such as evening dresses of silks, crepes, velvets, and gossamer woollens.
3. Fabrics with fugitive colours and garments with contrasting colours.
4. Fabrics with water-soluble finishes or trimmings.
5. White or light-coloured leathers such as are found in gloves, belts, and such like.

## Colour-fastness Test

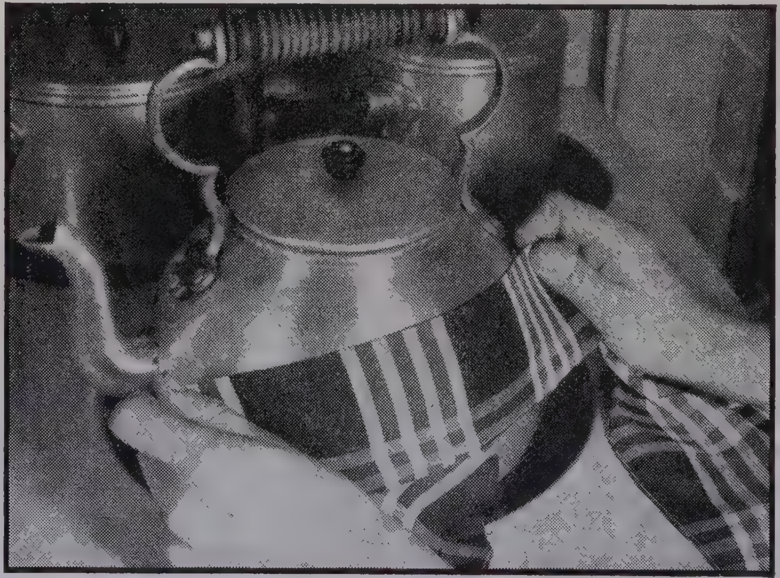
The end of a belt or some inconspicuous part of a garment which requires testing for colour fastness may be immersed in a bowl of hot water and left for a few moments, then squeezed out and dried; it can then be compared with the untreated portion. If there is no appreciable difference and the water is not coloured, the material can be considered washable. If the water is tinted after the first test, it does not necessarily mean that the fabric is not colour fast, but if the water is still coloured after the second or third test, the colours must be regarded as fugitive and the article treated accordingly.

## Shrinkage Test

To test for shrinkage a fairly large piece of material, say 5in. square, is necessary. A piece of paper the exact size of the sample is cut for comparison. The sample of material is washed in the usual way and tested for size against the control paper. If the sample is smaller, it should be ironed while still damp, because sometimes ironing corrects apparent shrinkage. If the washed and ironed sample is any smaller than the control paper, the material is not unshrinkable, and if the article is already made up, it should be dry cleaned. If the material is not made up, it should be preshrunk.

All photographs by Campbell Photography Ltd.

## Emergency Press for Ribbon or Collar



[*Sparrow*

IF hair ribbons, a loose collar, or the collar of a silk and rayon garment are crumpled and there is insufficient time to heat the iron, smooth the ribbon or crumpled collar against the side of any clean and very hot kettle or pot that is already on the stove.

—*MOLLY MACPHERSON, Field Officer in Rural Sociology,*
*Department of Agriculture, Auckland*

# Danger in the Home

FREQUENT accidents occur in and round the home, some minor and some fatal, but all avoidable if adequate precautions are taken. The home can be made safe, if safety is a habit, if children are guarded, and if old folks' frailties are considered. Such headlines as "Child Eats Caustic Soda", "Baby Scalded", "Woman Electrocuted", or "Elderly Woman Burnt to Death" need not apply to your family. In this article Molly Macpherson, Field Officer in Rural Sociology, Department of Agriculture, Auckland, draws attention to the fact that some unsuspected dangerous materials may be in use and some dangerous habits, unregarded as dangerous, may be prevalent in the home, and points out ways of preventing accidents by correcting the conditions which may cause them.

Above—Unattended fires should always have a guard in front of them. Left—Hot ashes should be put in metal containers well away from the house.

FIRE is one of the most feared dangers in the home. It "is a good servant, but a cruel master", and dangerous fires can start from a variety of causes, some of which are listed here.

## Fire

### Fires without Guards

All fireplaces and radiators are safe when a fire guard is used to prevent any accidental contact between the fire or radiator and the furnishings or clothing. A guard should be securely placed so that it will not fall away or allow sparks to pass. Electric radiators are available which are designed for safety against fire.

### Unswept Chimneys

Chimneys catch fire when there is an accumulation of unswept soot in the chimney. Having chimneys swept once a year is a wise precaution.

### Inflammable Materials

Most fabrics will burn or melt and can cause painful burns. Very light materials are more dangerous and extra precautions should be taken. Extremely dangerous inflammable materials are lacquered fabrics, nets or tulle, flannelettes, cottonwool, celluloid, some compositions of casein as in knife handles and picnic ware, and blasting powder. When these materials are used essential precautions such as the guarding of fires, heaters, and any naked flame will reduce the danger.

### Hot Ashes

Glowing embers may persist in ashes for a long time, and all care should be taken with hot ashes. The ash tin should be metal with a lid to prevent the ashes scattering and should be placed away from wood or wooden walls. It is necessary to provide another receptacle for rubbish which will burn.

### Smoking in Bed

A smoker in bed is surrounded by materials ideal for carrying fire and which may smoulder for some time before bursting into flame. In the meantime the smoker and other members of the household may have gone to sleep, thus allowing a much stronger fire to be established.

### Inflammable Spirits

All inflammable spirits are dangerous if they are used near any naked flame or within a building, where the spirit evaporates and explosive gases accumulate. Inflammable spirits should be stored away from the house and should be used away from naked flames and outside where the explosive

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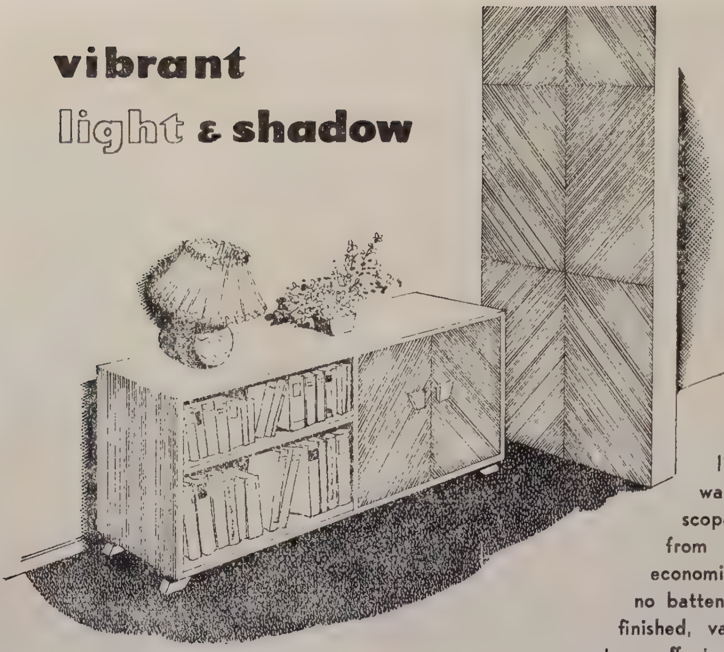

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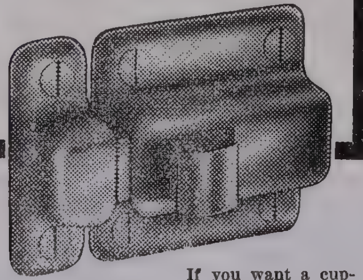

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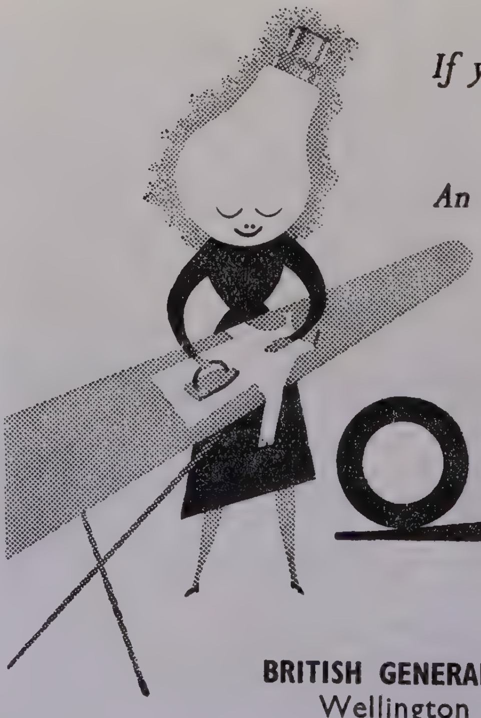

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gases can be dispersed and blown away harmlessly. For dry cleaning a fluid cleaner based on carbon tetrachloride (poisonous but not inflammable) is safer.

### Burning off Close to Buildings

Rubbish which will burn is dangerous if it is just left lying around; so are piles of wood, uncut grass, bracken fern and scrub, tree prunings, straw, and paper packing. These should be disposed of, and if they are burnt, this should be done away from the house or outbuildings, on a calm day, when flying sparks are not a hazard.

## Poisons

High on the list of home dangers are poisons such as insecticides and disinfectants, which are potentially dangerous because they may be mistaken for something else and may not be out of reach of children.

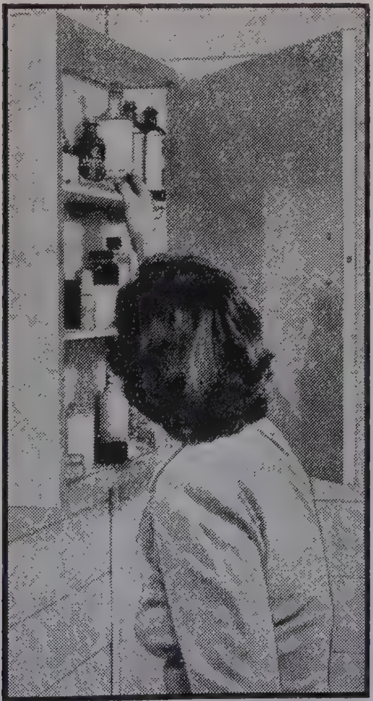
### Insecticides and Vermin Poisons

All powders and liquids used for killing insects and vermin round the house and outbuildings should be regarded as poisons. They should be covered securely and labelled clearly so that they are not mistaken for harmless materials, and kept out of the reach of children who cannot read, preferably in a high locked cupboard or on high shelves in rooms that can be securely closed against children. These poisons should never be stored with ingredients that are used for food preparation.

### Disinfectants and Cleaning Fluids

Disinfectants and cleaning fluids are used frequently, and although they require to be kept in a place easily accessible, the storage should be completely safe, especially where there are children. Therefore all disinfectants and cleaning fluids should be stored on high shelves or in locked cupboards. The containers should be securely closed to avoid spills, and clearly labelled so that mistaken identity will cause no accidents. These preparations should not be stored with foods or medicines or in containers which have formerly held food or soft drinks. After disinfectants and cleaning fluids have been used they should be returned to storage immediately, thus avoiding their being left unattended while they are out of storage.

Electric water jugs are much safer if a holder is attached to them. Care such as this throughout the home can prevent scalds.



Poisons should be stored in a high cupboard.

### Garden Sprays

Garden sprays also need safe storage on high shelves in securely closed rooms or in locked cupboards where they cannot be mistaken for other materials. Care should be taken that while in use or out of storage sprays are not left unattended at any time.

### Medicines, Pills, and Tablets

Because some medicines, pills, and tablets are brightly coloured, they are attractive to children. However, all these preparations should be stored on shelves and in cupboards inaccessible to children. All bottles and jars should be clearly labelled for contents and dose. Before the medicine is used the bottle or jar should be inspected to prevent mistakes and the directions for use read. No such preparations should be put into containers which have formerly held a harmless substance or food.

## Burns and Scalds

Burns and scalds can be caused by bad arrangement of equipment round the home and by carelessness.

### Trailing Cords from Electric Jugs

A cord from an electric jug should be long enough to reach between the plug socket and the place where the jug stands without being taut and without hanging in a loose loop so that young children can reach it or where it may be accidentally caught by people passing. The electric cord should never be placed across a space where people may pass or where the placing of utensils can pull the cord and upset the electric jug. A safety holder should be used for the electric jug, which should be in a safe place with the cord securely out of harm's way.

### Overhanging Pot Handles

The handles of pots and pans should always be away from the front of the stove so that children will not reach up to them and so that the clothing of people passing cannot catch on a protruding handle and upset the pot, the contents of which may be scalding hot.

### Steam Burns

With pressure cooking if all the directions and precautions in the leaflet with the pressure saucepan are followed, no accidents can happen. The kettle spout should be turned away so that steam cannot burn anyone working at the stove top.

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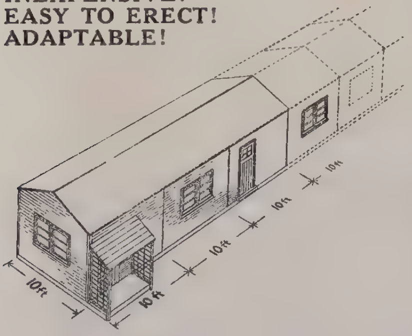
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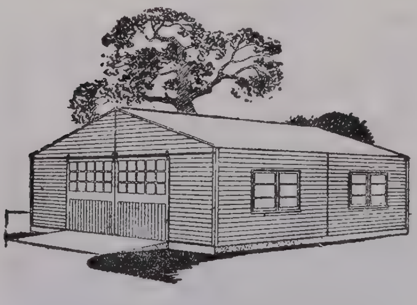

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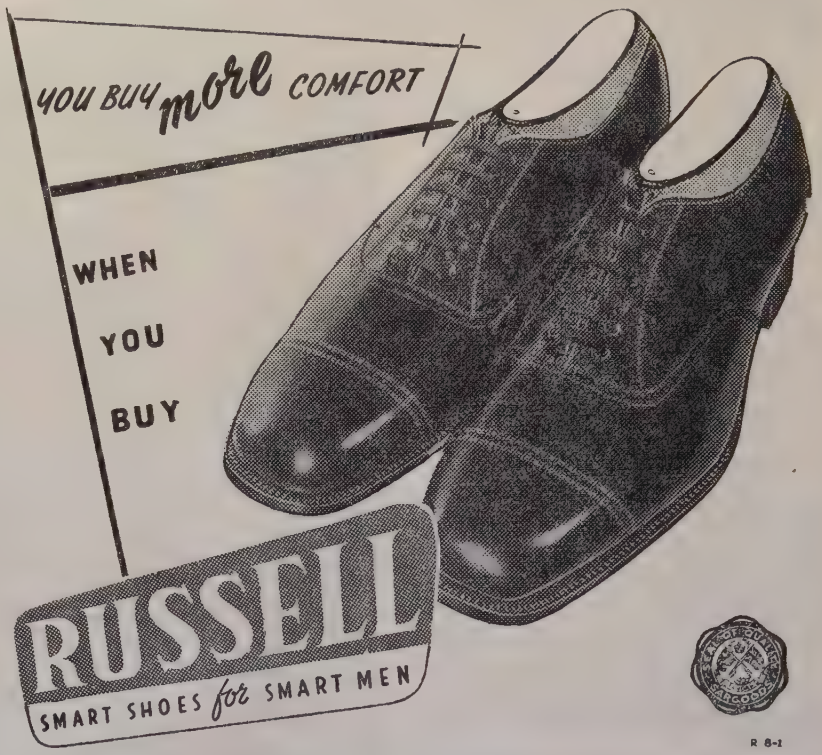
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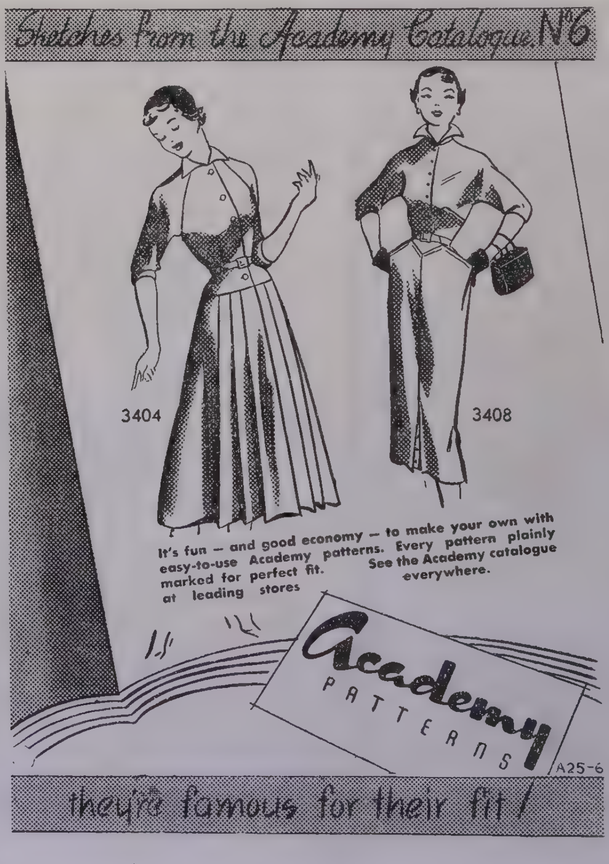
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### Handling of Cooking Ware

Any stove or oven ware containing hot liquid or hot food should be handled with care, as the container may break or the contents spill. Loose handles or cracked ware should be replaced to reduce the possibility of accidents.

### Oven Cloths and Pot Holders

Oven cloths and pot holders should be of good size and should protect the hands from contact with heat. Holes are a danger, as they catch on pot and pan handles or other protruding objects; any cloths or holders with holes in them or which are worn in any way should be replaced. It may be necessary to use two holders with large saucepans so that there is no danger of any hot surface touching the hands.

### Hot Bath Water

Before a child or disabled adult is put into a bath, the water should be tested to make sure it is not too hot. Bath water should always be tested before anyone enters it.

### Copper Boiling over

If a copper stick is placed across the top of a copper, the copper will not boil over; however, children should be prevented from going near the copper while there may be danger. Washing that has to be lifted from a hot copper to tubs must be handled with care and the hot, wet clothes should be placed on and around the copper stick so that they do not accidentally slip off; they should be lifted across a splash board placed between the copper and tubs.

## Electrical Hazards

Where permanent electrical wiring is not interfered with and the maintenance of electrical appliances is placed in the hands of registered electricians it is well established that electricity is safe to use and, through a wide range of applications, promotes the well-being of the entire household.

Electrical installations give many years of trouble-free service. Any householder in doubt about the condition of an installation should have it checked by a qualified electrician and should always employ such a person to make repairs, extensions, or alterations. Flexible cords are not suitable for use in place of permanent wiring and risk of fire is increased where such cords are laid under floor coverings, tacked to walls, passed through holes in the structure of the house, or taken through doorways.

REPAIRS DONE HERE OR AT HOME DAILY SERVICE

All repairs on electrical equipment should be done by a registered electrician.

From time to time portable electrical appliances should be checked by a qualified person. It is preferable that this check be carried out in the house, as the location in which an appliance is used has considerable bearing on its suitability.

The wall sockets into which the appliance is plugged should also be checked. Flexible cords require skilled attention, because, when they are repaired, it is essential that the connections be made correctly. Incorrect connections may not only rob the appliance of its protective earthing, but may turn the otherwise-safe appliance into a death trap.

In bathrooms electrical appliances must be installed as fixtures forming part of the permanent wiring, the use of portable electrical appliances being prohibited.

When a portable electrical appliance is being bought assurance should be sought that it is safe to use in all the intended locations and in the proximity of one or more of the appliances already in use. This may require checking by a qualified person.

When a plug is being pulled from the point, hands should be dry or a dry cloth should be used. No electrical fittings should be touched with bare, wet hands.

Oven cloths should be large enough to protect hands from scalds and burns.

Old fluorescent tubes should not be used as towel rails or as children's playthings, as they are doubly dangerous because of the possibility of broken glass and the harmful chemical that may be inside.

Contact with aerial electric lines should be avoided at all times. If such lines break, it is necessary to keep away from anything on which they rest. Climbing or working near electric lines can be dangerous. If work is necessary near lines going to outbuildings, the supply should be switched off, and if work is required near lines coming in from the road, the supply authority should be asked to disconnect these. Children must be warned about climbing on roofs near aerial electric lines, as touching these while standing on an iron roof is suicidal.

**Keep clear of aerial electric lines at all times, and if they fall, keep clear of any object on which they rest.**

## Falls

Falls are a common mishap round the home, especially for old people and children, and every care should be taken to ensure that furnishings and fittings are so arranged and made that the danger of falls is reduced as much as possible.

### Climbing on Unsafe Supports

Shelves and cupboards in a home are more convenient and safer if they are built within reach of an adult. However, if high shelves and cupboards are already installed, a safe method of reaching them is necessary. Step ladders which are firm and non-tipping and with steps which have sufficient room for a firm foothold should be used.

### Steps

Steps at doorways, including those of outbuildings, should be permanently constructed of sound materials with a non-slippery surface. Steps with much height require at least one hand-rail for support and an outside light to illuminate them at night. Where old people or children use steps a ramp with a hand-rail instead of steps is much safer and might be worth installing.

**Every kitchenette needs one!**

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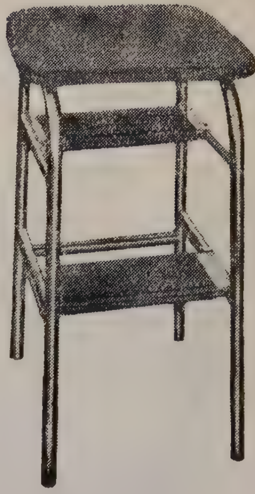

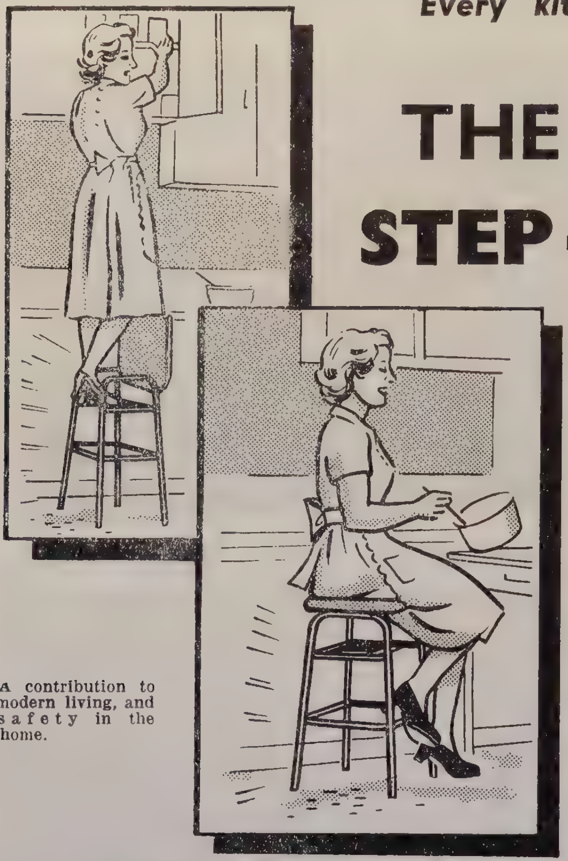

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## 191—HOME DANGERS . . .

### Floor Coverings

Small rugs are safer if pieces of non-slip material such as rubber are attached to the corners or edges to prevent slipping and curling. All frayed or torn carpets and mats are dangerous, as they may cause people to trip and fall, as will linoleum which is worn into holes. Highly polished floors may be attractive but are dangerous, especially under small mats where there is traffic back and forth. All grease and liquids spilt on the floor and not wiped up are liable to cause slips and falls.

### Objects Left Lying Around

When left lying around, toys, particularly those with wheels, can cause serious accidents. Pieces of furniture and household equipment left in unexpected places are dangerous. Pointed instruments such as scissors, screwdrivers, and sticks not only cause falls but may cause additional injuries. Some gardening tools have cutting edges and points. Chisels and saws have cutting edges. Hammers can fall from shelves and ledges. Rubbish can contain injurious articles. All these objects require a place for storage after use. Any objects left lying around are dangerous to everybody in daylight and dark, and storage space should be provided for the articles named. Use of the storage space should be insisted on, as should the habit of putting away with both children and adults.

### Buildings and Fences

Buildings and fences which have convenient stepping places invite children to climb. Such stepping places are not always safe and the tops of buildings are certainly not safe. High board fences often have narrow ledges which can be used to climb the fence but which are unsafe, and there is similar danger with a picket fence, the boards of which have sharpened points. There is danger where children can swing on gates and crush their fingers. Creation of such hazards should be avoided and all possible stepping places to heights should be removed. Ladders should never be left unattended against buildings. If buildings and fences are kept in good repair, no materials will fall and cause injury. Falls into wells and excavations would not happen if such danger spots were securely covered, marked, or fenced.

## Is Your Home Safe?

Avoidance of the dangers described will probably be assisted if those responsible for safety in the home consider the following points.

### Poisons

Are insecticides and poisons safe from children?

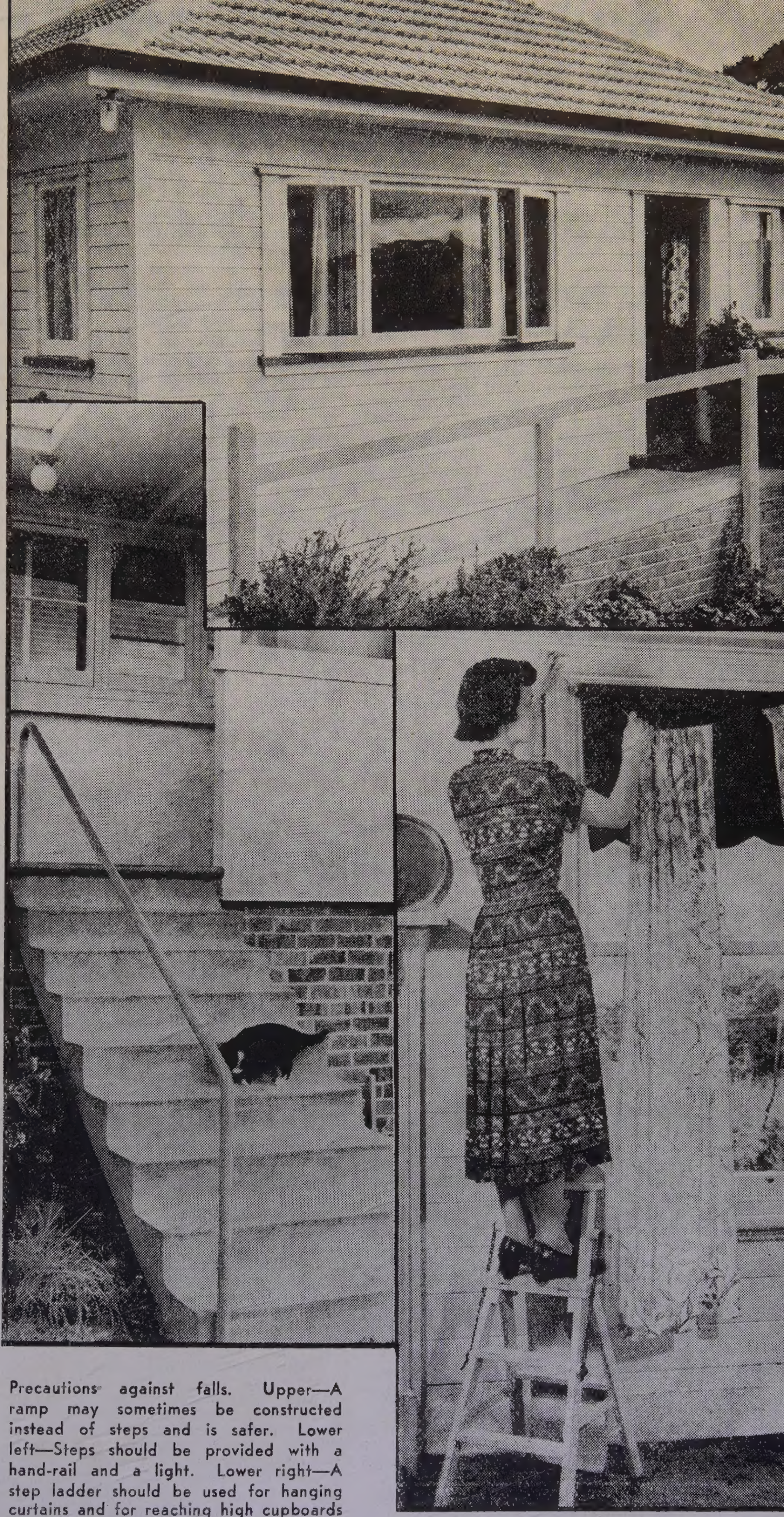
Are insecticides and poisons stored on their own?

Are all cleaning fluids and disinfectants stored high?

Are any liquids or powders which may be poisonous left unattended at any time?

Are all medicines and ointments clearly labelled?

Are labels read for directions before anything is used?



Precautions against falls. Upper—A ramp may sometimes be constructed instead of steps and is safer. Lower left—Steps should be provided with a hand-rail and a light. Lower right—A step ladder should be used for hanging curtains and for reaching high cupboards and shelves.

### Burns and Scalds

Is the electric jug cord the correct length?

Are handles of pots and pans turned away from the front of the stove or bench?

Are any objects with loose handles or any cracked ovenware in use?

Are pot holders and oven cloths efficient?

Is hot bath water tested before use to prevent scalding?

Is a copper stick laid across the copper to prevent boiling over?

### Electrical Hazards

A registered electrician should check all fuses and all electrical appliances to see that they are in good order and perfectly safe to use.

A registered electrician should do all repairs, extensions, and alterations to electrical installations and the maintenance of all appliances and flexible cords.

No portable electrical appliance should be used in a bathroom.

### Falls

Is a special step ladder used instead of a chair for reaching high shelves?

Are ladders and steps well built and kept in good repair?

Is there at least one hand-rail and a light on steps and stairs?

Has a ramp instead of steps been considered?

Are stairways clear of packages, mops, brooms, and tools?

Are small rugs placed away from traffic routes and the head of stairs?

Are small rugs non-skid?

Have children and adults the habit of putting things away?

Is spilt grease immediately mopped up?

Are children tempted with convenient stepping places to climb heights?

Are all wells and excavations clearly marked or fenced off?

### Fire

Is an unattended fire guarded with a fire guard?

Are chimneys and stove pipes inspected and cleaned regularly?

Are hot ashes stored in a metal ash can away from wooden buildings?

Is smoking in bed forbidden?

Are all inflammable spirits used in the open air away from naked flames?

Is the burning of rubbish avoided on a windy day and near buildings and haystacks?

### Miscellaneous

Are special containers provided for broken glass?

Are matches kept out of reach of children?

Are small things which children might swallow kept out of reach?

Are guns unloaded and locked up?

Is there a first-aid kit in the house?

Do you know how to treat electric shock cases?

Do you urge members of the family to work safely, play safely, and try to prevent accidents by correcting conditions which cause them?

**Keep this article and show it to your family.**

# COCOA

BEFORE Columbus set out to find the Spice Islands nobody of the "known" world knew of those refreshing drinks cocoa and chocolate. However, two highly civilised peoples in the Americas, the Incas and the Aztecs, had known them for many generations and used them as the national beverage. When Cortes and other conquistadores brought the new drink back to Spain it did not meet with universal approval, but it gradually spread through Italy, France, and Germany, and gained its greatest popularity in France. In Europe chocolate houses similar to coffee houses were started. One of the most famous of these in London was known as "The Cocoa Tree" and still exists as a club.

COCOA is produced from the bean of the tree *Theobroma cacao* (literally "food of the gods"), which grows between 20 and 30ft. high. The pods are produced on the trunk and main branches. There are several varieties of cacao, and some of the important producing countries are the Gold Coast, Venezuela, Ecuador, Trinidad, Sao Thome, San Domingo, and Brazil.

## Preparation of Beans

Cocoas are generally divided into strong and mild types according to the flavour, which depends on the variety of the tree, the climate, and the method of preparing the bean for grinding. The ancient Indians prepared the bean by fermenting it to remove the pulp, then roasting, shelling, and grinding it, and essentially the same practice is followed now.

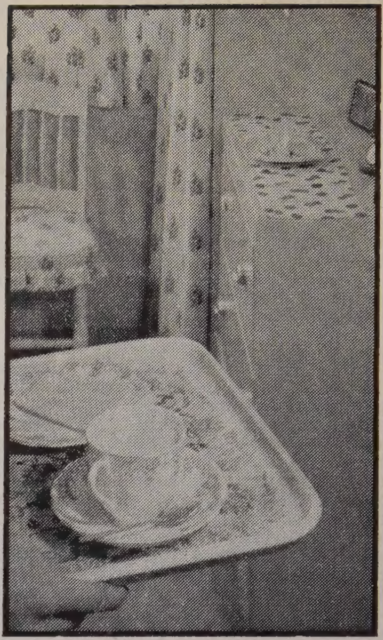
Merchants buy and blend different kinds of beans, which are fermented before they are exported. The blended beans are then roasted, shelled, and ground. Up to this stage the preparation is the same for both cocoa and chocolate. The paste resulting from the grinding contains a lot of cocoa butter, and if the paste is to be made into cocoa, some of the butter is pressed out; this butter is retained and added to the portion of the paste which is to be made into chocolate. Chocolates are divided into dark and milk chocolates and have sugar, flavourings, milk solids, coconut, fruit, and nuts added.

## Thin and Thick Cocoas

Cocoas are divided into "thin" or soluble types and "thick" types, according to the beverage they yield when the powder is stirred in boiling water.

Thick cocoas comprise prepared cocoas, homeopathic cocoas, caracas cocoas, pearl cocoas, maravilla, and chocolate powders. Sugar and arrowroot are sometimes added to make them less rich. They vary in quality and price according to the proportion of cocoa nibs (roasted, shelled beans), the quality of the ingredients, the skill of the blending, and the care taken in rejecting all inferior pieces of nib. Navy cocoa is one of the thick cocoas.

Thin cocoas include cocoa essences, cocoa extracts, and concentrated cocoas. In the preparation of these about two-thirds of the natural butter is extracted to leave the remainder a dry powder which is then prepared for sale. A teaspoonful of this in either hot milk or hot water makes a dark thin, tea-like beverage which is less rich than the thick cocoas. Cocoa as it is bought from a grocer is a thin cocoa.



[*Sparrow*

## Cocoa Drinks

Several different ways in which cocoa drinks can be prepared in the home are:—

### Cocoa

1 teaspoon of cocoa
1 teaspoon of sugar
¾ cup of hot milk
Pinch of salt

Mix the cocoa, sugar, and salt to a paste with ¼ cup of water and add the hot milk. A piece of marshmallow on top is an attractive garnish.

**Creamy cocoa:** Add ½ teaspoon of cornflour to the mixture and whisk the drink before serving it. This makes a thicker beverage which does not separate out readily.

**Cocoa with egg:** Just before serving the cocoa add ½ egg per cup and whisk the drink lightly.

Another method of preparing cocoa is to mix 2 teaspoons each of sugar and cocoa and pour on a cup of boiling water. Add 1 teaspoon of whipped cream just before serving the drink, or omit the sugar and add 1 teaspoon of sweetened condensed milk.

### Chocolate Syrup

3 tablespoons of cocoa
½ tablespoon of butter
A pinch of salt
A few drops of vanilla
¼ cup of sugar

Melt the butter and add the cocoa, sugar, salt, and ¾ cup of hot water. Boil the mixture gently for 5 minutes. Cool it and add the vanilla. Bottle the syrup and keep it in a cool place. Add 1 tablespoon to 1 cup of hot milk to make chocolate. This syrup also makes a pleasing sauce for ice cream.

### Chocolate Milk Shake

Mix 1 tablespoon of chocolate syrup with 1 cup of cold 24-hour-old milk and beat them well. Two tablespoons of ice cream may be added. Serve the drink very cold.

*—NELL MACPHERSON,*
*Field Officer in Rural Sociology,*
*Department of Agriculture,*
*Auckland*

Printed by Blundell Bros. Ltd. (The Evening Post), Wellington—35205

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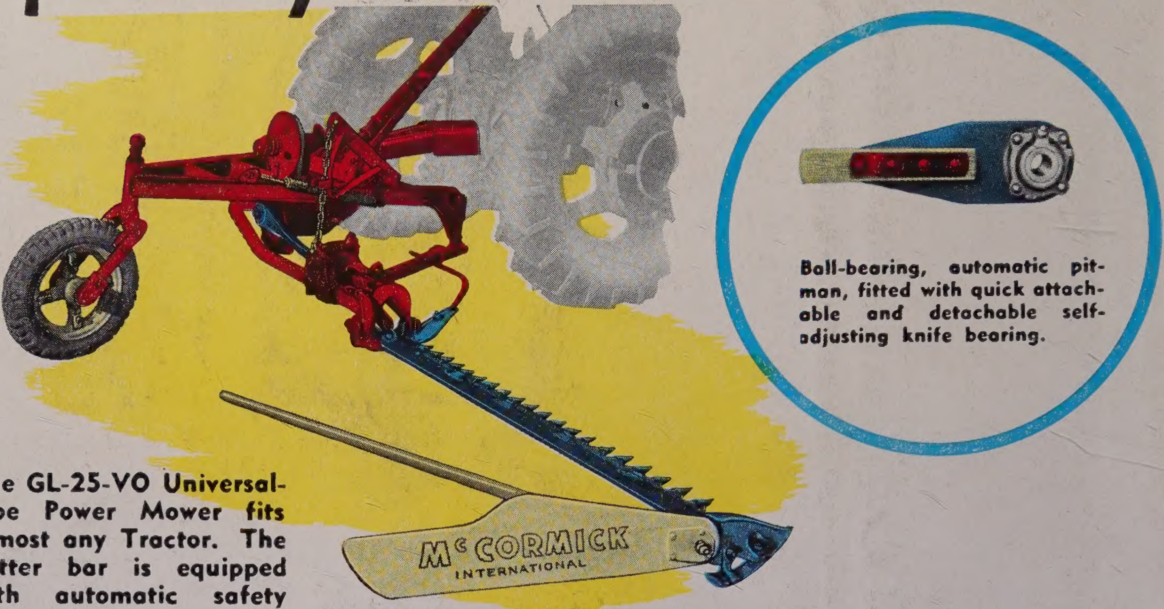

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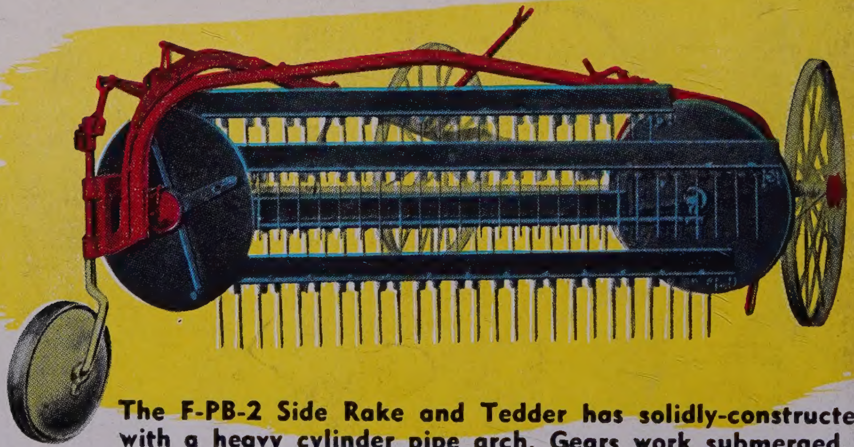

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